

I-95 Express Lanes – Opitz Boulevard Ramp ("Opitz") Project

Exhibit C-6

Technical Requirements

Includes:

Section 1: Project Management

Section 2: Public Information and Communications

Section 3: Design and Construction Requirements

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Attachments

- 1.0 Opitz Project Scope of Work
- 1.3 Project Development Plans
- 1.5a Standards and Specifications
- 1.5b Design Criteria
- 1.10 Security Requirements for Concessionaire Operated Critical Infrastructure
Facilities and Structures
- 3.4a Opitz Project Geotechnical Report
- 3.4b Opitz Project Geotechnical Data Report for Signs and ITS Structures

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TECHNICAL REQUIREMENTS

PURPOSE

The purpose of these Technical Requirements is to identify the minimum scope and technical requirements to develop the I-95 Express Lanes – Opitz Boulevard Ramp Project (“Opitz Project” or “Opitz”). The Work required by the Technical Requirements will be undertaken by or on behalf of the Concessionaire. Throughout these Technical Requirements where the terms “Opitz Construction Contract” or “Opitz Construction Contractor” are used, the use of such terms is solely to provide a reference to additional clarifying information. The Concessionaire shall be governed by the Agreement, including these Technical Requirements, in the performance of the Work and remains responsible to the Department for its completion. Neither the Opitz Construction Contract nor the Opitz Construction Contractor shall impose any direct obligations on the Department not required by the Agreement or these Technical Requirements.

Refer to Attachment 1.0 for a general summary of the scope of the Opitz Project and the Work.

ACRONYMS

Acronym	Definition
AACE	American Association of Cost Engineers
AFC	Approved for Construction
AMRL	AASHTO Material Reference Laboratory
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted Cost of Work Scheduled
BMS	Building Management System
BPPS	Bridge Pier Protection System
CADD	Computer Aided Drafting and Design
CRM	Customer Relations Management
CTA	Cement Treated Aggregate
DBE	Disadvantaged Business Enterprise
DE	Design Exception
DMS	Dynamic Message Sign
DW	Design Waiver
EDMS	Electronic Document Management System
EPA	Environmental Protection Agency
ETTM	Electronic Tolling and Traffic Management
FDC	Field Design Change
FHWA	Federal Highway Administration
F.O.B.	Free on Board
GCS	Gate Control System
GP	General Purpose
HOT-OC	HOT (Express Lanes) Operations Center
HPC	High Performance Concrete
HPS	High Performance Steel
HSE	Health, Safety and Environment

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Acronym	Definition
ICD	Interface Control Document
ID	Asset Identification
IDMS	Incident Detection and Monitoring System
IIM	VDOT Instructional and Informational Memorandum
IPPM	Internal Policy/Procedure Memorandum
IRI	International Roughness Index
ITS	Intelligent Transportation Systems
JOMP	Joint Operating and Maintenance Protocols
KPI	Key Performance Indicators
LCAMS	Lane Closure Advisory Management System
LDR	Load-related Distress Rating
LPN	License Plate Number
LRFD	Load and Resistance Factor Design
MATOC	Metropolitan Area Transportation Operations Coordination
MLHCC	Modified Latex Hydraulic Cement Concrete
MOMS	Maintenance Online Management System
MOT	Maintenance of Traffic
MPSTOC	McConnell Public Safety and Transportation Operations Center
MRP	Maintenance Rating Program
MSE	Mechanically Stabilized Earth
MUA	Master Utility Agreement
NADR	Noise Abatement Design Report
NATR	Noise Analysis Technical Report
NBIS	National Bridge Inspection Standards
NCR	Non-Conformance Report
NDC	Notice of Design Change
NDR	Non Load-related Distress Rating
NRO	Northern Regional Operations
NTCIP	National Transportation Communications for ITS Protocol
O&M	Operations and Maintenance
OCR	Optical Character Recognition
ORT	Open Road Tolling
OSPS	Operating Speed Performance Standard
PDM	Precedence Diagram Method
PDP	Project Development Plan
PE	Professional Engineer
PIP	Public Information Plan
PS&E	Plans, Specifications, and Estimate
PVC	Polyvinyl Chloride
RWIS	Road Weather Information System
SPI	Schedule Performance Index
SWaM	Small, Women- and Minority-owned Business Enterprise
T&DI	Toll and Driver Information
TAMS	Turnkey Asset Maintenance Services

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Acronym	Definition
TCRO	Traffic Control Room Officers
TMP	Transportation Management Plan
TMS	Traffic Management System
TOC	Traffic Operations Center
TS&L	Type, Size, and Location
TTC	Temporary Traffic Control
TTMS	Tolling and Traffic Management System
UIT	Ultrasonic Impact Testing
VDEM	Virginia Department of Emergency Management
VECTOR	Virginia Evacuation Coordination Team for Operational Response
VES	Vehicle Enforcement System
VOS	Volume, Occupancy & Speed
VSLS	Variable Speed Limit Signs
WBS	Work Breakdown Structure

DEFINITIONS

Capitalized terms used but not otherwise defined have the respective meanings set forth in Exhibit A to the Agreement. In addition, the following terms have the meanings specified below:

Best Efforts means exerting every available resource and allowing sufficient time (a minimum of 30 days) to settle claims with landowners amicably.

Design Exception is defined as a document required where it is either impractical or not economical to obtain the AASHTO minimum design criteria as shown in the Geometric Design Tables. In such a case, an exception shall be secured from the State Location and Design Engineer and FHWA (if applicable).

Design Waiver is defined as a document required when deviations from Department's design criteria occur. When design criteria meet or exceed AASHTO minimal design but fall short of Department's minimal design, a Design Waiver shall be required. Design Waivers will be applicable to all projects regardless of functional classification and funding and shall be documented and approved in accordance with the Design Waiver Request form LD-448.

Disaster Recovery Plan is as defined in Section 3.16.24 of the Technical Requirements.

Opitz Construction Contract means the contract between the Concessionaire and Opitz Construction Contractor for the design and construction of the Project, in the form attached to the Agreement as Exhibit LL-1, as it may be amended or supplemented.

Opitz Construction Contractor means [TBD]

Opitz Design Plans means the VDOT approved Pre-Advertisement Conference / Advertisement Plans ("PAC Plans") corresponding to the VDOT LD-436 Quality Control Checklist.

Opitz TMS Contract means the contract between the Concessionaire and TMS Contractor for the design and construction of the tolling and traffic management systems for the Project, in the form attached to the Agreement as Exhibit LL-2, as it may be amended or supplemented.

Opitz TMS Contractor means TRANSURBAN (USA) INC, a Delaware corporation.

Free Flow means conditions where vehicular traffic can maintain generally consistent speeds without experiencing undue delay or breakdown in flow.

In-service Availability means a percentage of time equivalent to (hours available) / (hours in service) x 100%; in service time excludes scheduled down time and loss of power outside Concessionaire control.

International Roughness Index (IRI) is the standard measure of ride quality used by the Department.

Load-related Distress Rating (LDR) is a deduct-based index having a value of 100 when the pavement being evaluated has no discernible load-related distress.

Mainline is the primary roadway in which the traffic sensors for speed and other traffic data operate excluding auxiliary lanes, collector-distributor roads or ramps.

Monthly Progress Report is as defined in Section 1.4.4 of the Technical Requirements.

Noon is 12:00 p.m. Eastern.

Non Load-related Distress Rating (NDR) is a deduct-based index similar to the Load Rated Distress Rating (LDR) except that the distresses assigned to the index are non-load rated.

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Notification Center is as defined in Section §56-265.15. of the Code of Virginia.

Peak Period is the period from 5:30 a.m. – 9:00 a.m. and/or 4:00 p.m. – 7:00 p.m., Monday through Friday, excluding holidays.

Permit to Work – means authorization or approval from the Concessionaire and/or its operating entities to perform specific activities within the limits of the 95 Express Lanes.

Potomac Formation (silts/clays) are silts/clays defined as such in the Geologic Map of Virginia published by the Virginia Division of Mineral Resources.

Project (or Opitz Project) solely for the purposes of this Exhibit C-6, is used interchangeably with and has the same meaning as “Opitz Project” as defined in Exhibit A to the Third Amended and Restated Comprehensive Agreement as more fully described in Attachment 1.0. For the avoidance of doubt, within this Exhibit C-6, “Project” does not have the definition provided in Exhibit A to the Second Amended and Restated Comprehensive Agreement.

Project Recovery Schedule is the schedule submitted by the Concessionaire to the Department whenever the Monthly Progress Report shows the Opitz Final Completion Date has 30 days of negative float; Project Recovery Schedule submittals shall include a list of all activities changed, added or deleted along with all logic changes, and an accompanying narrative explaining the nature of the changes.

Quality Assurance Manager (QAM) means the person reporting to the Construction Contractor’s Project Manager responsible for the independent process of determining conformance of work by examining the quality control data.

Residual Life means the calculated duration that any Asset of the Opitz Project, subject to the type of routine maintenance of the Asset which is normally included as an annually recurring cost in highway maintenance and repair budgets, will continue to comply with any applicable Performance Requirement or standard after the end of the Term, before Major Maintenance is required, determined through the application of Residual Life methodology and residual life inspections.

Security Plan is as defined in Section 3.16.23 of the Technical Requirements.

Standard Documents means the standards, specifications, standard drawings, and special provisions listed in Attachment 1.5a to the Technical Requirements – Standards and Specifications..

Standard of Care means using logical, rational, and common sensible calculation and precaution in determining whether there is reason to believe that property to be acquired for rights of way may contain concealed or hidden wastes or other materials or hazards requiring remedial action or treatment.

Station is one or more traffic monitoring sensors at a single location used to collect traffic volume, lane occupancy, and speed data on the HOT Lanes.

Substandard Station is a Station whose weighted average speed over the a.m. or p.m. Peak Period falls below the minimum average operating speed defined for each degradation standard.

Substructure means the part of a structure that is below the bearings of simple and continuous spans, skewbacks of arches, and tops of footings of rigid frames, together with the back walls, wingwalls, and wing protection railings.

Superstructure means the portion of a structure that is not defined as substructure.

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Transponder Transaction Performance means the percentage of vehicles with transponders that are correctly identified by the Tolling System.

1 Project Management

1.1 Overview

- A. The Concessionaire acknowledges that Concessionaire review, concurrence, approvals, inspections, variations, and acceptance of the Work is subject to Department review, concurrence, approvals, inspections, variations, and acceptance of the Work. The Concessionaire also acknowledges that Concessionaire review, concurrence, approvals, inspections, variations, and acceptance of the Work may be subject to third-party review, concurrence, approvals, inspections, variations, and acceptance. Third-parties may include, but not be limited to FHWA and other appropriate governmental agencies.
- B. The Concessionaire shall establish and maintain an organization that effectively manages all elements of the Opitz Project Work. The Opitz Project management effort will be defined and guided by the Opitz Project Development Plans (PDPs), as described in Section 1.3.
- C. Opitz Project management activities shall include, but not be limited to, scope, schedule, cost, and document management, and will be consistent with the Work Breakdown Structure (WBS) developed by the Concessionaire.

1.2 Project Administration

1.2.1 General Requirements

- A. The Concessionaire's management approach shall provide all components of an effective and efficient management system, including: communication and reporting; documentation of Work; supervision of Work personnel and activities; all tools, facilities, and materials; environmental protection and mitigation; safety of Work personnel; and any other management elements needed to produce and document a quality, safe, efficient, and operable Opitz Project.
- B. All prospective contractors, subcontractors, lower tier subcontractors, and prime contractors of joint ventures shall prequalify with the Department and shall have received a certification of qualification prior to undertaking Work on the Opitz Project. This restriction does not apply to consultants, manufacturers, suppliers, or haulers.
- C. Subcontracting or otherwise delegating any portion of the Work shall not relieve the Concessionaire of any responsibility for the fulfilment of the Agreement. Further, delegation or subcontracting of the Concessionaire's responsibilities shall not diminish the Concessionaire's obligation to report directly to the Department, unless the Department expressly agrees to accept reports or communications from third parties.

1.2.2 Department Staffing and Points of Contact

- A. The Department will provide an Opitz Project specific management structure with a combination of dedicated and shared resources to manage and oversee the Department's rights or interest in the Opitz Project.
- B. Authority of the Department Representative:
 - 1. Inspection by the Department Representative shall not relieve the Concessionaire of any obligation to furnish acceptable materials or complete construction in accordance with the Agreement.
 - 2. The Department Representative is authorized to conduct independent inspection and oversight of all Work performed and materials furnished, in accordance with the Agreement. As noted in the Agreement, the Department has the right at all times during the Term to carry out Oversight Services with respect to all aspects of the development, construction, and operations of the Opitz Project.

1.2.3 Workers

- A. Each party shall notify the other party, in writing, if they believe any person employed by the Department, the Concessionaire, the Opitz Construction Contractor, TMS Contractor, or any subcontractor:
 - 1. Is not performing his or her work in a proper or skillful manner;
 - 2. Is intemperate or disorderly; or
 - 3. Is acting in an unsafe manner.
- B. The party receiving the notice will immediately investigate the specifics of the notification and provide a response to the party initiating the notification, within 5 days, detailing a plan of action to resolve the written concerns. If the employees' actions create an unsafe environment for the Concessionaire's workers, the Department personnel or travelling public, the notified party will immediately stop the operations to resolve safety issues in accordance with the Agreement.

1.2.4 Not Used

1.2.5 Submittals

- A. The Concessionaire shall or shall cause to be coordinated, delivered, and processed, all submittals to the Department as required by the Agreement.
- B. The Concessionaire shall cause all draft, revised, and final submittals to be accurate, complete, and in a form and at a level of detail to enable the Department to satisfactorily discharge its review and approval obligations.

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- C. All submittals shall be prepared in US Customary Units in accordance with the applicable Standards and Specification in Attachment 1.5a.
- D. The Concessionaire shall provide all Design Documentation and Construction Documentation as electronic files formatted as per VDOT Computer Aided Drafting and Design (CADD) Manual and, if required, sealed by a Professional Engineer licensed in the Commonwealth of Virginia. These documents will include, but are not limited to, the following items:
 - 1. Design calculations and analysis;
 - 2. Mix designs;
 - 3. Reports, studies, and investigations;
 - 4. Opitz Project Schedule;
 - 5. Design Public Hearing and/or Public Meeting Documentation;
 - 6. Design Documentation, including documentation of key design decisions, permitting, right of way submittals, right of way and/or construction revisions;
 - 7. Construction Documentation, including detailed design submittals and Approved for Construction (AFC) Documents, construction sketches, shop drawings, working drawings, and diagrams;
 - 8. Temporary Traffic Control (TTC) plans and documentation;
 - 9. Soil boring logs, laboratory test results, quality control records and audits, and all other testing and inspection documentation, etc.;
 - 10. Material communications relating to Design Documentation and Construction Documentation;
 - 11. Responses to reviewed comments;
 - 12. Change (Work) Orders (including all related communications and disputes resolution proceedings);
 - 13. Governmental Approvals; and
 - 14. Third party approvals.
- E. The Concessionaire shall deliver all electronic submittals using the Opitz Project Electronic Document Management System (EDMS), unless otherwise directed. E-mail may be used to notify the Department of the availability of submittals.

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- F. All design submittals shall be submitted electronically in *.pdf format. AFC Documents shall include the designs in *.pdf format, CADD files in *.dgn format, and hard copies. The Department may request the Concessionaire provide CADD *.dgn files of any design submittal to facilitate its review. The Concessionaire shall provide hard copies of any Design Documentation or Construction Documentation submittals upon request by the Department.
- G. Electronic versions of the AFC Documents shall be submitted within seven (7) business days of receiving final design approval. AFC Documents shall not incorporate any changes to the approved Final for Approval documents unless otherwise approved. Upon receipt of the electronic AFC Documents, the Department will provide any comments to the Concessionaire within three (3) business days. If comments are provided, the Concessionaire shall address and resubmit within three (3) business days. If no comments are provided or the AFC Documents submittal is deemed acceptable by the Department, the Concessionaire shall provide five (5) hard copies of all AFC Documents within three (3) additional business days.
- H. Hard copies of the AFC Documents shall be 11” x 17.” The Concessionaire is required to provide two (2) hard copies of AFC Documents for the Department’s records and two (2) hard copies of for the Federal Highway Administration’s (FHWA) records.
- I. Submittals will be deemed “received” by the Department (thereby triggering the applicable timeframe for review) upon receipt of the complete package of electronic files, inclusive of all required information necessary to perform a complete review. Packages received after 3:00pm will be deemed received the following business day. The Department will notify the Concessionaire within three (3) business days if the package is incomplete and will include the basis for the submittal being deemed incomplete.
- J. Whenever the Concessionaire is obligated to make a Construction Documentation submittal pursuant to the Agreement, the Concessionaire shall include with such submittal the signed cover sheets described below.
 - 1. A cover sheet, signed by the Opitz Construction Contractor’s Representative, that includes the following certification:
 - i. The Opitz Construction Contractor certifies or has caused to be certified that [description of submittal] was prepared by professionals having the requisite qualifications, certifications, credentials, skills, and experiences needed to prepare the submittal in accordance with the requirements of the Opitz Construction Contract.
 - ii. The Opitz Construction Contractor certifies or has caused to be certified that it has reviewed the submittal for completeness; the submittal accurately depicts the Work to be undertaken or

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performed; and the submittal was prepared in accordance to, and otherwise complies with:

- the Opitz Construction Contract
- the Technical Requirements;
- the approved QMSP;
- applicable Law; and
- Governmental Approvals.

2. A cover sheet, signed by the subcontractor, supplier or consultant who prepared or is otherwise in responsible charge of the submittal, that includes the following certification:

- i. [The name of subcontractor, supplier or consultant], which is under contract with the Opitz Construction Contractor to perform services related to the Opitz Construction Contract, certifies that it prepared or is otherwise in responsible charge of the [description of submittal].
- ii. The [description of submittal] was prepared by professionals having the requisite qualifications, certifications, credentials, skills, and experiences needed to prepare the submittal in accordance the requirements of the applicable contract documents.
- iii. The [description of submittal] is complete and accurately depicts the Work to be undertaken or performed; and the submittal was prepared in accordance with, and otherwise complies with:
 - the applicable contract documents;
 - the Technical Requirements;
 - the approved QMSP;
 - applicable Law; and
 - Governmental Approvals.

K. The Department's review of the Concessionaire's submittals will relate only to conformance to and compliance with the requirements of the Agreement. Any deviation from the requirements of the Agreement must be specifically described and accompanied by explicit supporting justification. The

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Department's review shall not relieve the Concessionaire of responsibility for errors and/or omissions in the submittals.

- L. If the Concessionaire's approved Design Documentation needs to be revised after approval of the AFC Documents, then the Concessionaire shall use either a Notice of Design Change (NDC) or a Field Design Change (FDC) or to document the change. Any required NDC or FDC shall be submitted for review prior to implementation of construction associated with the NDC or FDC. NDC and FDC review and approval shall be completed within ten (10) days of receipt of a complete and accurate submittal by the Concessionaire. Any basis for disapproval will be provided to the Concessionaire in writing. Unless otherwise mutually agreed by all parties, weekly meetings shall be conducted to review open and forthcoming NDC and FDC submittals.

- M. The Department may request interim submittals at any time for any of the above noted items for complex or unusual elements of the Work, or for elements where no applicable standards exist, if the Department can reasonably demonstrate that additional information is necessary to complete review of any such Work. Such interim submittals shall be developed to address the specific requests for information and shall be submitted within fourteen (14) days from the request, or other such timeframe as may be mutually agreed.

- N. Subject to applicable confidentiality requirements as required by Law, the Concessionaire shall provide to the Department through its Electronic Document Management System (EDMS) or other type of approved electronic storage and retrieval system, hard copies and electronic copies of all correspondence, meeting minutes, and other external documents (including emails) constituting any and all material Opitz Project communications with:
 - 1. Governmental Authorities;
 - 2. Business and Opitz Project stakeholders;
 - 3. Landowners;
 - 4. News media;
 - 5. Utilities;
 - 6. Railroads or transit entities; and
 - 7. Community stakeholders.

1.2.6 Plans and Drawings

- A. The Concessionaire shall furnish all plans and drawings showing such details as are necessary to give a comprehensive understanding of the Work specified. Except as otherwise shown on the plans, dimensions shown on the plans are

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measured in the respective horizontal or vertical planes. Dimensions that are affected by gradients or vertical curvatures shall be adjusted as necessary to accommodate actual field conditions and shall be specifically denoted on the working drawings.

- B. The Concessionaire shall furnish working drawings to the Department as required or requested.
- C. Plans and drawings that will be prepared by the Concessionaire include: a) Design and Construction Plans covering individual work packages (if applicable), b) Permitting Plans, c) Design Public Hearing Documentation, d) Right-of-Way Plans, e) Shop Drawings and Working Drawings, f) Temporary Traffic Control Plans, g) As-Built Plans, and all approved changes to these plans, including Notice of Design Changes (NDCs), Field Design Changes (FDCs), and Non-Conformance Reports (NCRs).
- D. Plans and drawings shall not incorporate any deviations from the Technical Requirements unless the changes are specifically denoted, together with justification, and are approved in writing by the Department in accordance with the Agreement.
- E. The Concessionaire shall identify working drawings and submittals by the complete State project and job designation numbers. Items or component materials shall be identified by the specific item number and specification reference in the Agreement.
- F. A Professional Engineer licensed in the Commonwealth shall certify working drawings for but not limited to falsework supporting a bridge superstructure; concrete structures and pre-stressed concrete members; lighting, signal, and pedestrian poles; electrical and communication systems infrastructure; sign structures; breakaway support systems; anchor bolts; retaining walls and foundations.
- G. If a railroad, municipality, or other entity as specified in the Agreement or on the plans is required to review the working drawings, the Concessionaire shall submit to the Department a plan of operations showing the design and method of proposed operations and shall provide the Department evidence of approval by railroad, municipality, or other entity providing approval before performing any work. The plans shall be clear and legible, and details shall be drawn to scale.
- H. Prior to manufacture of non-standard items, the Concessionaire shall furnish to the Department a certification of the acceptability of the design of such non-standard item, as determined from a review which shall be made on behalf of the Concessionaire by a Professional Engineer licensed in the Commonwealth. Such certification shall cover all design data, supporting calculations and materials. Non-standard designs previously certified or approved by the Department will not require recertification.

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- I. The Department's review of the Concessionaire's plans and drawings will relate only to conformance to and compliance with the requirements of the Agreement. Any proposed deviation from the requirements of the Agreement must be specifically described and accompanied by explicit supporting justification. The Department's review shall not relieve the Concessionaire of responsibility for errors and/or omissions in the plans and drawings.
- J. The plans and working drawings shall be appropriately signed and sealed by a professional licensed in the Commonwealth, as applicable.

1.2.7 Location of Offices and Accommodations for Department's Staff during the Project

- A. The Department encourages co-location of its key staff with the Concessionaire during the design and construction period. The Department desires to cooperate with the Concessionaire during the design development and review period in order to create efficiencies for the benefit of the Project.
- B. The Concessionaire shall establish one primary field office or dedicated Class C or better office space, the location of which is to be determined and mutually agreed to by the Concessionaire and the Department, but which is expected to be within the Project corridor. This work shall consist of locating, procuring, furnishing, erecting, equipping, maintaining, cleaning (weekdays), and removing and restoring property upon completion of use of the field office. The Concessionaire has the option to provide either modular trailers or to rent office accommodations to satisfy the Project office requirements. The Opitz Project field office shall be located in Prince William County within reasonable proximity of the Opitz Project.
- C. Concessionaire shall provide, maintain and manage fully outfitted, furnished and networked office space for Concessionaire and Department use, including at a minimum insurance, lease agreements, Utility connections, Utility service, internet service, maintenance, janitorial, security and other services necessary to provide the required office facilities.
- D. Concessionaire shall provide parking facilities sufficient for the number of Concessionaire and Department personnel assigned to the location plus visitor parking.
- E. Concessionaire shall be responsible for loss to Department and visitor property as a result of fire, theft, malicious acts, and other human activity or related causes
- F. The field office shall include the following:

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Space	Quantity	Minimum Size (SF)
Office (Department)	2	100
Workstation Cubicle (Department & Concessionaire)	10	64
Conference Room (Shared)	2	250
File Room (Shared)	1	100
Storage Room (Shared)	1	100
Kitchen (Shared)	1	---
Washroom (Shared)	1	---

Work spaces provided for Concessionaire and Department personnel shall be available for their exclusive use at any time during the design and construction of the Opitz Project.

- G. Concessionaire shall provide Department continuous access and maintain, at a minimum, the following systems and equipment at the field office location:
 - 1. High-speed internet connection with minimum 100 Mbps download/100Mbps upload with static IP address;
 - 2. Network connected color printer/scanner/copier/fax, minimum 600 dpi and 30 pages per minute, staple, duplex and paper handling up to 11"x17";
 - 3. Computer network wiring for each office, desk and conference room to support Department-provided file server (for Department's dedicated use) and all other networked devices.

- H. Concessionaire shall provide field office site and floor plans for review and comment no less than 30 calendar days prior to occupancy.

- I. The field office shall be available and operational from 30 days after the latter of Financial Close or Construction Notice to Proceed to 30 days after Final Completion. Furnishings and equipment specified shall be in sound and functional condition throughout the duration of the project.

- J. The field office and equipment as required herein shall remain the property of the Concessionaire

- K. The Concessionaire shall provide and maintain in a neat, sanitary condition such accommodations for the use of its employees, as well as the employees or agents of the Department, as may be needed to comply with the requirements of applicable Law.

- L. The field office shall be weatherproof, tightly floored and roofed, constructed with an air space above the ceiling for ventilation, supported above the ground

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and anchored against movement. The floor-to-floor ceiling height shall be at least 7 feet 6 inches. The inside walls and ceilings shall be constructed of, Masonite, gypsum board, or other similarly suitable materials as permitted by fire and building codes. The exterior walls, ceiling and floor shall be insulated.

- M. Lighting, Heating, and Air Conditioning: The field office shall have satisfactory functional lighting, electrical outlets, heating equipment, an exhaust fan, and air conditioner connected to an operational power source. At least one of the light fixtures shall be a fluorescent light situated over the plan and drafting table. There shall also be at least one 100 watt exterior light fixture at each exterior doorway. Electrical power and fuel for heating equipment shall be furnished by the Concessionaire.

1.2.8 Document Management System

- A. The Concessionaire shall establish and maintain an Electronic Document Management System (EDMS) to store and record all material documents generated on the Opitz Project, including those records required under Law.
- B. In the provision of an EDMS, the Concessionaire will:
1. use data systems, standards, and procedures with consistent naming and searching protocols;
 2. ensure document retention for any minimum statutory period(s);
 3. provide a secure EDMS, such that only authorized users have access and that it is protected from theft, damage, unauthorized or malicious use;
 4. provide a mechanism for the electronic transfer of metadata along with the associated document in standard business file format; and
 5. provide the Department with written procedures and training of staff who will be required to access all relevant documents generated under the Agreement. All electronic information submitted to the Department shall be searchable and legible, to the extent practical.
- C. In the relevant Project Development Plan, the Concessionaire shall:
1. reference the specific EDMS tool to be used by the Concessionaire and the access methods available to the Department and others that may need access to the system;
 2. describe methods by which all documents issued and received by the Concessionaire shall be uniquely coded and retrievable in a user-friendly format; and

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3. describe upon completion of the Opitz Project, the transfer of EDMS data and files, such that the Department has a complete set of material project documentation in electronic format and written documentation on the contents of the data.

1.2.9 Project Meetings

- A. Authorized Representatives and other pertinent representatives of the parties shall meet within 10 days after any Notice to Proceed issued in accordance with the Agreement to discuss issues affecting the administration of the Work and to implement the necessary procedures, including those relating to submittals and approvals, to facilitate the ability of the parties to perform their obligations under the Agreement.
- B. Within 14 days (or other period of time as mutually agreed by the parties) after the satisfaction of the conditions precedent to begin construction as set forth in the Agreement and prior to the start of construction, the parties and their respective representatives shall conduct a pre-construction meeting to discuss the Concessionaire's planned construction operations. At the pre-construction meeting, the parties shall discuss, among other things, safety, the sequence of the Work, scheduling, constructability issues, coordination with Separate Contractors, Governmental Authorities and Utilities, and work zone impacts to traffic.
- C. The Concessionaire shall hold monthly joint progress meetings with the Department. During such meetings, progress during the prior month, Work to be undertaken during the next month, and encountered or anticipated issues shall be reviewed, and the Concessionaire shall collect information from any Contractors responsible for Work completed during the specified duration and Work scheduled during the upcoming reporting duration. These meetings shall be attended by the Concessionaire Representative and other personnel as requested by the Department, including relevant Contractors. Meetings will occur monthly beginning the month after the initial Notice to Proceed is issued. The Concessionaire shall be responsible for preparing, maintaining and distributing minutes of the meetings to all attendees for review. The meeting minutes shall be provided to the Department within three days after the monthly progress meeting or such other timeframe as mutually agreed. The parties may cancel a monthly progress meeting from time to time if they mutually agree that such meeting is not necessary.
- D. As part of, and in conjunction with, the monthly progress meetings required by the Agreement, the Concessionaire shall provide the Department with any proposed updates of the Baseline Schedule for the Department's review, and, if required by the Technical Requirements, approval, and a progress narrative in accordance with Section 1.4.3.
- E. The Concessionaire and the Department shall agree to other meetings as appropriate and mutually agreed.

1.2.10 Not Used

1.2.11 Not Used

1.3 Project Development Plans

1.3.1 General

- A. The Concessionaire shall provide Project Development Plans (PDPs) for the Opitz Project as defined in this section and detailed in Attachment 1.3 to these Technical Requirements. Such PDPs shall address the activities of the Concessionaire and shall not obligate the Department to perform any activity unless agreed to in writing by the Department.

1.3.2 Project Development Plans

- A. The Concessionaire shall develop and maintain a quality control and quality assurance system for the PDPs as part of its overall Quality Management System Plan (QMSP).
- B. The Department may audit and monitor the activities described in the PDPs to assess the Concessionaire's compliance. Any audit findings shall be adequately addressed within 30 days of the Department's audit report.

1.3.3 Project Development Plan Updates

- A. The Concessionaire shall annually, if requested by the Department, update the PDPs and have mechanisms in place to monitor progress and identify opportunities for improvement.
- B. A PDP or procedure shall be updated pursuant to Attachment 1.3, if such PDP or procedure:
 - 1. does not adequately address the matters it is intended to address;
 - 2. does not conform or is otherwise necessary to comply with the Agreement;
 - 3. has to be changed because of an audit;
 - 4. no longer represents current or appropriate practice; or
 - 5. is required by the Agreement to be updated.

1.3.4 Not Used

1.4 Schedules

Any Notices to Proceed shall be in accordance with the Agreement.

1.4.1 Opitz Project Schedules

A. Schedule Purpose, Format, and Content:

1. The purpose of the Opitz Project Schedule is to ensure that adequate planning, scheduling, and resource allocations occur to provide a reasonable and executable work plan, cash flow projections, and continuous monitoring and reporting for Work performed or remaining. The Baseline Schedule and the monthly updates to the Project Schedule shall be used for coordinating the Work, monitoring the progress of Work performed, identifying Work to be performed, evaluating changes, and a tool for measuring progress.
2. The Opitz Project Schedule shall consist of the Initial Opitz Baseline Schedule, the Baseline Schedule, updates to the Opitz Project Schedule, any revised Baseline Schedules or the As-Built Schedule as applicable.
3. Opitz Project Schedules will be reviewed in accordance with the Department Post-Award Scheduling Guide and the American Association for the Advancement of Cost Engineering (AACE) International Recommended Practice No. 53-06 as appropriate. Acceptance by the Department of the Opitz Project Schedule will not relieve the Concessionaire from its responsibility to complete all Work within the Opitz Project Schedule. In addition, the Department's acceptance of any Opitz Project Schedule creates neither a warranty, expressed or implied, nor an acknowledgment of the reasonableness of the activities, logic, durations, or cost loading of the Concessionaire's Opitz Project Schedule. Furthermore, acceptance of the Opitz Project Schedule will not relieve the Concessionaire from complying with all the requirements of the Agreement.
4. Terms not defined herein, in the Agreement shall have the same meanings ascribed to them in the AACE International Recommended Practice No. 10S-90 ("Cost Engineering Terminology").

B. General Requirements:

In the Opitz Project Schedule, the Concessionaire shall:

1. ensure that the actual number of activities in the schedule is sufficient to assure adequate planning of the Work and to permit monitoring and evaluation of progress and perform the analysis of alleged time impacts;
2. ensure that design activities identify AFC Documents;

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3. apply the Critical Path Method (CPM) of network calculation to generate the Opitz Project Schedule (the critical path shall be based on the longest network path through the Opitz Project) and prepare the Opitz Project Schedule using the Precedence Diagram Method (PDM) to establish relationships and interdependencies between the individual activities required to complete the Opitz Project;
4. ensure that activity identification numbers, textual descriptions, and codes are consistently applied in the Opitz Project Schedule and are unique for each specific activity;
5. divide all Work prior to Opitz Final Completion Date into activities with appropriate logic ties to show the Concessionaire's overall approach to sequencing, include logical relationships between activities reflecting the Concessionaire's actual intended sequence of Work; and logically tie all activities to avoid open ends;
6. show the Opitz Project milestones, including the issuance of any Notices to Proceed, any agreed interim milestones, the Opitz Project Service Commencement Date, and the Opitz Project Final Completion Date;
7. show phasing of the Work as detailed in the plans, subcontractor work, procurement, fabrication, delivery, installation, testing of materials and equipment, commissioning of systems, and any long-lead time orders for major or significant materials and equipment;
8. allocate an estimated cost to the appropriate lowest level elements (activities) of the Work Breakdown Structure (WBS) by use of labor, material and equipment resources;
9. reflect the required coordination with other contractors working within or adjacent to the Project Site, utility owners, Governmental Agencies, transit entities and railroads, engineers, architects, contractors, and suppliers;
10. identify regulatory approvals required and the dates by which such approvals are necessary;
11. be fully compliant with the Agreement;
12. conform to the Work Restrictions (Section 1.8) and Maintenance of Traffic (Section 1.9) requirements;
13. reflect the ROW Acquisition Plan;
14. reflect the utility relocation activities; and

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15. reflect the requirements of the TMS Interface Plan prepared by the Concessionaire for completing all work necessary to commence systems (TMS and ETTM) operations prior to set testing periods (stand alone, central, and in-service burn).
- C. The scheduling software employed by the Concessionaire shall be compatible with the Department's scheduling software. The Concessionaire's scheduling software must have the capability to import and export data in the Primavera proprietary exchange format (*.xer). As of the date of the Agreement, the Department's scheduling software is the latest version of Primavera's Project Management software (P6).
- D. Float available in the Opitz Project Schedule, at any time, shall not be considered for the exclusive use of either the Department or the Concessionaire. During the course of the Work, any Float generated is not for the sole use of the party generating the Float; rather it is a shared commodity to be reasonably used by either party. A schedule showing work completing in advance of the Opitz Final Completion Date, and accepted by the Department, will be considered to have Opitz Project Float. Opitz Project Float will be a resource available to both the Department and Concessionaire. No time extensions will be granted unless a Delay Event occurs which impacts the Opitz Project's critical path, consumes all available float or contingency time, and extends the work beyond the Opitz Final Completion Date as defined by the Agreement.
- E. Use of Float suppression techniques, such as; preferential sequencing, lag logic restraints, zero total or free float constraints, extending activity times, or imposing constraint dates other than as required by the contract, shall be cause for rejection of any Project schedule or its updates.
- F. If the parties cannot agree to a Opitz Project Schedule, either party may refer the disagreement to the dispute resolution procedures set forth in the Agreement.
- G. The Concessionaire shall maintain at all times, at its office, a minimum of one complete set of all schedule reports shown above. All schedule reports shall be available to the Department for inspection and audit. Additional reports may be required as future needs dictate, and the reports listed above may be deleted (by mutual consent of the parties).
- H. The Concessionaire shall exercise resequencing logic to minimize any Delay Event before requesting any extension of time.

1.4.2 Initial Opitz Baseline Schedule

- A. The Initial Opitz Baseline Schedule is the Concessionaire's conceptual plan for the design and construction of the Opitz Project. This schedule shall be

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used to monitor performance of the Work until the Baseline Schedule is approved by the Department.

- B. The schedule submitted with the Concessionaire's Proposal shall be the Initial Opitz Baseline Schedule.
- C. The Initial Opitz Baseline Schedule, which shall outline the Concessionaire's proposed plan to accomplish the Work, shall be a Gantt Chart showing the sequencing of major operations and shall include a detailed narrative.

1.4.3 Baseline Schedule

- A. Within 15 days of the Notice to Proceed Date, the Concessionaire shall submit to the Department for its review and approval a proposed Baseline Schedule, which shall include the Concessionaire's detailed plan for construction of the Opitz Project. The Concessionaire shall develop its proposed Baseline Schedule from the Initial Opitz Baseline Schedule. The Concessionaire shall submit to the Department an electronic version of the proposed Baseline Schedule created in the Primavera proprietary exchange format (*.xer). Hard copies shall be provided upon request.
- B. Within 21 days of the Department's receipt of the proposed Baseline Schedule, the Department shall notify the Concessionaire in writing of its approval or disapproval of the proposed Baseline Schedule, and of any comments it has or amendments it wishes the Concessionaire to make. The Concessionaire shall give due consideration to the Department's suggested amendments or comments and, to the extent it deems appropriate, revise the proposed Baseline Schedule and re-submit the same within 21 days to the Department for its review in accordance with this clause B for the Department's approval. Within fourteen days of the Department's receipt of the re-submitted proposed Baseline Schedule, the Department shall notify the Concessionaire in writing of its approval or disapproval. Upon approval by the Department, the proposed Baseline Schedule will become the Baseline Schedule. If the parties cannot agree to a mutually acceptable Baseline Schedule, either party may refer the disagreement to the dispute resolution procedures set forth in the Agreement. Until such time as the dispute is resolved, the Initial Opitz Baseline Schedule will be used for the design and construction of the Opitz Project. The Baseline Schedule shall include a well-organized WBS, the development of which is based on a deliverable-oriented methodology that captures all the Opitz Project activities. The WBS shall allow schedule summarization at a minimum of four hierarchical WBS Levels, such as: Opitz Project areas (Level 1), WBS elements (Level 2), work packages and deliverables (Level 3) and the detail control level (Level 4) to which the individual schedule activities are assigned their WBS code.
- C. Activities in the Baseline Schedule shall be assigned Opitz Project-specific activity codes.

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- D. The Baseline Schedule shall include all major activities of the Work in sufficient detail to enable the Department to monitor and evaluate design and construction progress from the Notice to Proceed Date until Final Completion.
- E. The Baseline Schedule shall include separate activities for major submittals proposed by the Concessionaire, together with appropriate activities for the Department's review or approval, provided that such review and/or approval times by the Department shall be no less than the time provided for such reviews in the Agreement.
- F. The Baseline Schedule shall be broken down into work packages and deliverables generally completed in not less than one but no more than 30 days, or as mutually agreed (unless such deliverable is a procurement or other non-construction activity), and with dollar value (price) of each appropriate lowest level element of the WBS identified. The total cost loaded into the Baseline Schedule shall be equal to the total cost of the Opitz Contract.
- G. The Work shall be broken down in sufficient details to identify the phase, stage, feature, type of Work, deliverable, and specific location in which the Work occurs, including as applicable:
 - 1. Opitz Project milestones, including the anticipated issuance of any Notices to Proceed, the commencement of construction activities, the Opitz Project Service Commencement Date, and the Opitz Project Final Completion Date;
 - 2. Administrative activities such as key submittals, notifications, and review by the Department;
 - 3. Design activities showing all Work required to complete each stage of design and deliverable;
 - 4. Public involvement activities;
 - 5. Environmental and permitting activities;
 - 6. ROW acquisition activities showing all parcels;
 - 7. Utility relocations and adjustments, including all specific types and locations;
 - 8. Procurement, fabrication, and delivery activities of materials;
 - 9. Construction start-up activities such as mobilization, staging areas, surveying, clearing and grubbing, and construction access;
 - 10. Maintenance of Traffic (MOT) / traffic control activities;

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11. Construction activities broken down by phase stage, feature, type of work, and specific location, as applicable;
 12. ETTM System and Traffic Management System (TMS) infrastructure construction, procurement of equipment, device installation, systems commissioning, integrations, testing and in-service equipment burn period prior to Final Completion;
 13. Other necessary miscellaneous activities that consume time, for example, installation and removal of temporary systems or structures such as shoring, load tests, curing, demolition, testing and acceptance periods including all activities necessary for the complete testing and inspection of all Work as necessary to achieve proper activation and use of the Work, punch list, clean-up, and demobilization.
- H. Activity calendars shall be assigned using project-level calendars. Use of global calendars is not allowed and shall be cause for rejecting the Opitz Project Schedule. Activity codes shall be defined and assigned to the individual activities to allow for filtering, grouping, and sorting of activities by project phase, responsibility, area, phase, stage, feature, work type, Change Orders, Disadvantage Business Enterprise, and other major work category, as applicable. Activity codes shall be assigned using project-level activity codes. Use of global activity codes is not allowed and shall be cause for rejecting the Opitz Project Schedule.
- I. Constraints shall be used sparingly and on a case-by-case basis, as necessary. Constraints such as “Mandatory Start” or “Mandatory Finish” that violate network logic are not allowed and shall be cause for rejecting the Opitz Project Schedule. If the Opitz Contract includes a specified “start-no-earlier than” milestone, then the Opitz Contract milestone activity shall be constrained with a “Start On or After” constraint, with a date equal to the date specified in the Opitz Contract. If the Opitz Contract includes a specified Intermediate Milestone or Final Completion milestone, then the Opitz Contract intermediate completion milestone activity or Final Completion milestone activity shall be constrained with a “Finish On or Before” constraint, with a date equal to the date specified in the Opitz Contract.
- J. The Opitz Project Schedule software settings shall be defined according to the following Primavera (P6) settings:
1. Duration type for all activities shall be specified as “Fixed Duration & Units.”
 2. Percent Complete type for all activities shall be specified as “Physical % Complete”.
 3. The “Drive activity dates by default” checkbox in the Opitz Project Details Resources tab shall be marked.

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4. The “Link Budget and At Completion Cost for not started activities” checkbox in the Project Details Calculation tab shall be marked.
 5. The “Reset Remaining Cost and Units to Original” in the Project Details Calculation tab shall be specified.
 6. The “Subtract Actual from At Completion” under “When updating actual units or costs” in the Project Details Calculation tab shall be specified.
 7. The “Update units when costs changes on resource assignments” checkbox in the Project Details Calculation tab shall be marked.
 8. The “Link Actual and Actual This Period Units and Cost” checkbox in the Project Details Calculation tab shall be marked.
 9. Specify “Retained Logic” in the Scheduling Options dialog box for scheduling progressed activities.
 10. Specify “Longest Path” in the Scheduling Options dialog box for defining critical activities.
 11. Specify “Finish Float = Late Finish – Early Finish” in the Scheduling Options dialog box as the schedule calculation option to compute total float.
- K. The Opitz Project Schedule shall use “Stored Period Performance” with Financial Periods to commence on the first day of a month and end on the last day of a month.
- L. The Opitz Project Schedule shall be calculated using the precedence diagram network logic method and the CPM. The use of resource-leveling to determine sequence, order, or timing of the activities is not allowed and shall be cause for rejecting the Opitz Project Schedule.

1.4.4 Monthly Progress Reports and Project Schedule Updates

- A. The Opitz Project Schedule will be current, reflecting actual progress at the time of submittal to the Department and will be kept current and submitted as a component of the Monthly Progress Report (further described below).
- B. The Concessionaire’s Monthly Progress Report shall include the following:
1. Document control certification sheet (verification that all field documentation is being maintained);
 2. Specific construction activities and deliverables occurring during the previous month (reporting period);

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3. Specific construction activities and deliverables planned for the next two reporting periods;
4. Progress narrative that describes, at a minimum, the overall progress for the preceding month, a critical path analysis, a discussion of problems encountered and proposed solutions thereof, any pending delay analysis or TIAs, and float. With each submission of the Opitz Project Schedule, the Concessionaire also shall include:
 - i. An electronic working copy of the Opitz Project Schedule (in XER file format). Each submission shall have a unique file name to indicate the type and order of submission. Each compact disk shall be labeled to indicate the type of submission, file name, and schedule data date;
 - ii. A narrative progress report of the Opitz Project Schedule that describes, at a minimum, the Concessionaire's plan of operation for meeting the interim milestones and the Opitz Final Completion Date, an evaluation of the critical path, a discussion of Opitz Project-specific issues encountered since the last submission as such issues relate to the schedule, proposed solutions thereof, work calendars, constraints, delays experienced, and the status of any submitted or pending Time Impact Analyses, float consumption, if any, and the reasons for such consumption; documentation of any logic changes, duration changes, resource changes or other relevant changes; The monthly progress narrative shall also include the following:
 - a. details of any aspects of the Work which may jeopardize the completion in accordance with the Agreement; and
 - b. measures being (or to be) adopted to overcome such aspects and a list of approvals needed to adopt such measures.
 - c. Time-scaled logic diagram indicating the critical path, early start and early finish dates, total float, sorted and grouped by the WBS;
 - d. Tabular schedule reports grouped by WBS and sorted by Start indicating for each WBS, activity, the activity number, description, original duration, remaining duration, physical percentage completion, cost percentage complete, original budgeted cost, cost this period, cost to date, and cost to complete;
5. A comparison of actual and planned progress including (1) illustrating schedule variance graphically by plotting and budgeted cost of work performed (BCWP) and the budgeted cost of work

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- scheduled (BCWS), and (2) reporting the scheduled performance index (SPI), defined as the ratio of BCWP divided by BCWS;
6. Identification of activities requiring Department and FHWA input or assistance, to the extent reasonably known;
 7. Action items/outstanding issues;
 8. A work breakdown structure Level 3, 4 or greater design and construction schedule;
 9. Opitz Project cost summary;
 10. Quality management reporting, as defined within the Concessionaire's QMSP, including quality inspection reports and daily inspection reports;
 11. A statement by the Concessionaire that the Baseline Schedule is the schedule being executed to perform the Work;
 12. Non-Conformance Reports and resolution reports;
 13. Right of way acquisition activities;
 14. Environmental permitting and compliance activities;
 15. Utility relocation activities;
 16. Disadvantage Business Enterprise (DBE), Small, Women-owned, and Minority-owned Business (SWaM), on the job (OJT) training quarterly usage;
 17. Safety activities;
 18. Digital photographs of the progress of the Opitz Project; and
 19. A summary of any outstanding potential issues, any Delay Events or Compensation Events and the measures adopted (or to be adopted) to overcome such issues.
- C. The Monthly Progress Report shall describe the work performed since the previous update as well as the Concessionaire's plan for accomplishing the remaining Work. It shall describe the current status of the Opitz Project and any deviations from scheduled performance as well as the causes and effects of the deviations. It shall also describe any progress deficiencies or schedule slippages as well as any actions taken or proposed to avoid or mitigate the progress deficiencies or schedule slippages.

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- D. Monthly Progress Reports shall have a reporting period ending on the last day of each calendar month and shall be submitted on or before the 25th of the month following the reporting period.
- E. The Department will notify the Concessionaire of any comments within five days of receipt of an acceptable submission of a Monthly Progress Report. If the Department requests that the Monthly Progress Report needs a specific revision, the Concessionaire shall make the requested changes within five (5) days after receiving the Department's request or such other time frame as mutually agreed between the parties. If the Concessionaire objects to the Department's request for revisions, the Concessionaire may refer the matter to dispute resolution pursuant to the Agreement.
- F. Opitz Project Schedule Updates:
 - 1. The Concessionaire shall update the Opitz Project Schedule no less than monthly to reflect actual progress to date and to forecast progress going forward (the "Opitz Project Schedule Updates"). The Opitz Project Schedule Update shall be submitted as an attachment to the Monthly Progress Report or as required by the Agreement. The Data Date used to calculate the schedule shall be the first day following the last day of the reporting period. Opitz Project Schedule Updates shall comply in all respects with the schedule requirements set forth in this section.
 - 2. The Approved Initial Opitz Baseline Schedule will be the basis for Opitz Project Schedule Updates until such time as the Baseline Schedule is approved by the Department. Thereafter the Baseline Schedule shall be the basis for Opitz Project Schedule Updates.
 - 3. Opitz Project Schedule Updates shall depict activities that have started, are on-going, or completed as of the new data date; show actual start dates for activities that have started; and actual finish dates for completed activities.
 - 4. Opitz Project Schedule Updates shall depict percent complete for on-going activities. Activity percent complete for work-in-place shall be based on the amount of work completed relative to the total amount of work planned for the activity.
 - 5. Opitz Project Schedule Updates shall depict remaining duration for on-going activities. Remaining duration for unfinished activities shall be based on the amount of time required to complete the remaining work as of the new data date.
 - 6. Activity relationships for the remaining activities shall be modified as necessary to correct out-of-sequence progress for on-going

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activities or to reflect the Concessionaire's current plan for completing the remaining Work.

7. All changes to the Opitz Project Schedule shall be documented in detail in the Monthly Progress Report. Such changes include but are not limited to: additional, revised or deleted activities, durations, calendar assignments, or logic ties.
8. The Opitz Project Schedule Update submitted with the last Monthly Progress Report will be identified by the Concessionaire as the As-Built Schedule.

1.4.5 Weekly Reporting

During the performance of the Work, the Concessionaire shall provide a weekly report, which shall include the following:

- A. Specific design and construction schedule activities, including locations for the week concluding and the upcoming week;
- B. Rolling 3-week forward-looking inspection notice, which shall include the fabrication schedule and planned construction activities; and
- C. MOT weekly update regarding any scheduled lane closures and identification of work areas for the ensuing two weeks.

1.4.6 Revisions To Baseline Schedule

- A. If the Department believes in its reasonable discretion that the Baseline Schedule needs a specific revision either in logic, activity duration, WBS, manpower, or cost, the Department will request the Concessionaire in writing to make such revisions. The Concessionaire shall give due consideration to the Department's suggested revision and, upon consultation with the Department, if determined appropriate, make such revisions within ten days after receiving the Department's request or such other timeframe as mutually agreed between the parties. Once approved, this update shall then become the Baseline Schedule. At no time shall the Concessionaire continue to reflect an item of non-concurrence from the Department in the updates to the Baseline Schedule; provided that if an item of non-concurrence has been referred to dispute resolution, then the Concessionaire shall continue to perform its Work in accordance with the then current Baseline Schedule in effect, until such time as the dispute is resolved and an updated Baseline Schedule is agreed to. If the Concessionaire objects to the Department's request for revisions, the Concessionaire may refer the matter to dispute resolution pursuant to the Agreement.
- B. In the event of a Delay Event for which the Department grants relief from the Opitz Final Completion Date to the Concessionaire in accordance with the

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terms of the Agreement, the Baseline Schedule will be revised to reflect the relief granted and submitted to the Department for approval in accordance with the Agreement.

1.4.7 Project Recovery Schedule

- A. Pursuant to the Agreement, whenever the Monthly Progress Report shows either of the Service Commencement Date or the Opitz Final Completion Date has 30 days of negative float, the Concessionaire shall submit a Opitz Project Recovery Schedule to the Department for approval. Opitz Project Recovery Schedule submittals shall include a list of all activities changed, added or deleted along with all logic changes, and an accompanying narrative explaining the nature of the changes.
- B. Once a Opitz Project Recovery Schedule is reviewed and approved by the Department, it shall become the Baseline Schedule and be used as the basis for subsequent Monthly Progress Reports. The Concessionaire shall archive all approved Opitz Project Schedules.
- C. Submission of a Project Recovery Schedule does not waive any rights under the Agreement.

1.4.8 Time Impact Analysis (TIA)

- A. Time Impact Analysis (TIA) for Proposed Extensions of Time (Prospective) (Also referred to as Schedule Impact Analysis or SIA).

In conjunction with the submission of a proposed change, the Concessionaire shall submit any proposed schedule impact as a result of impacts it claims to the Critical Path, if any, that the proposed change will create, in the TIA format, as prescribed in AACE Recommended Practice 52R-06 and submitted as outlined herein.

The following shall apply if a TIA is required by the Agreement:

1. The TIA shall be based on the date on which the alleged Delay Event is claimed to have occurred, or, in the event of a proposed change, the date on which the implementation of such change is proposed to be commenced.
2. The TIA shall show the current status of the Work using the current Baseline Schedule. The time computation of all affected activities shall be detailed in the TIA along with a demonstration of steps used to mitigate impacts. Cost of mitigation measures shall be fully documented within the TIA, if applicable.
3. Each TIA shall include a Fragmentary Network (“fragnet”) demonstrating how the Concessionaire proposes to incorporate the impact into the Baseline Schedule. A fragnet is defined as the sequence of new activities

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and/or activity revisions, logic relationships, and resource changes that are proposed to be added to the existing schedule to demonstrate the influence of impacts to the schedule. The Concessionaire understands it has a duty to mitigate any and all alleged delay events, whether prospective or retrospective, and such analysis will take advantage of the factual events leading to the alleged delay impacts; take into consideration all possible mitigation methods, techniques, and available resources, including but not limited to logic changes, resource allocations, activity durations, and consideration of calendar changes. The fragnet shall identify the predecessors to the new activities and demonstrate the impacts to successor activities. The Concessionaire shall insert the fragnet into the Baseline Schedule, run the schedule calculations, and submit the impacted schedule in accordance with this section. The Concessionaire shall include a narrative report describing the effects of new activities and relationships to milestones and the Opitz Final Completion Date with each TIA.

4. Except as provided in the Agreement, the Concessionaire shall not be entitled to any extension of the Term automatically as the result of an activity delay. The Concessionaire recognizes that certain events will not affect the existing critical activities or cause non-critical activities to become critical, thereby not causing any effect on the Opitz Final Completion Date.
5. Two copies of each TIA report together with an electronic file (in XER file format) of the Opitz Project Schedule impact analysis shall be submitted to the Department in accordance with the Agreement.
6. Upon approval, a copy of the TIA signed by the Department will be returned to the Concessionaire and incorporated into the next update to the Baseline Schedule. The TIA will be reviewed by the Department in accordance with ACEC International Recommended Practice No. 52R-06 "Time Impact Analysis As Applied in Construction".
7. A TIA will be approved or disapproved by the Department in its reasonable discretion within 21 days following receipt thereof, unless subsequent meetings or negotiations are necessary. The approved TIA related to a Change shall be incorporated into, and attached to the applicable Change Order. A disapproved TIA will be returned to the Concessionaire with appropriate comments for revisions or the Department's basis for denying the alleged Delay Event. If no agreement is reached, either party may refer the matter to dispute resolution pursuant to the Agreement.

1.4.9 Delay Event Claim Analysis (Non-Prospective)

In the event of a claimed delay event that the Concessionaire alleges has impacted the Critical Path of the Opitz Project, the claim analysis shall use a retrospective observational analysis format as prescribed by the ACEC 29R-

03 Recommended Practice for Forensic Schedule Analysis. Such analysis will take advantage of the factual events leading to the alleged delay impacts; take into consideration all possible mitigation methods, techniques, and available resources; and minimize any prospective analysis or conclusions. The Department in its reasonable discretion will approve or reject such claim within 21 days following receipt thereof, unless subsequent meetings or negotiations are necessary. A rejected claim will be returned to the Concessionaire with appropriate comments for revisions or the Department's basis for denying the alleged Delay Event. If no agreement is reached, either party may refer the matter to dispute resolution pursuant to the Agreement.

1.5 Standards and Specifications

1.5.1 General Requirements

- A. The Work shall conform to the Standards and Specifications set forth in Attachment 1.5a. Where the Concessionaire's design requires design methods or construction procedures not covered by the attached list of Standards and Specifications, the Concessionaire shall obtain the Department's approval before using such methods or procedures, not to be unreasonably withheld or delayed.
- B. All Work shall comply with the Agreement and these Technical Requirements, including all applicable Attachments. The Concessionaire may submit a written request for the use of non-Department standards only if specific Department standards do not exist. The Concessionaire is responsible for demonstrating that any non-Department standard that is proposed conforms to applicable AASHTO Standards.
- C. When a provision of "Division I – General Provisions" of the Road and Bridge Specifications is applicable, the VDOT "Division I Amendments to the Standard Specifications" shall apply.

1.5.2 Design Criteria

- A. The Concessionaire shall derive the functional classifications, design speeds, special load requirements, design criteria, and other applicable design issues using the Technical Requirements and the Standards and Specifications set forth in Attachment 1.5a.
- B. The Design Criteria established for the Opitz Project are provided in Attachment 1.5b. The Concessionaire shall comply with the functional classifications, design speeds, and other design criteria specified in Attachment 1.5b.
- C. The Concessionaire is responsible for obtaining any Design Exceptions and/or Design Waivers required to construct and operate the Project.

1.5.3 Interpretation of Standards and Specifications

- A. Standards for the Work and order of precedence are as set forth below. The Road and Bridge Standards, the Road and Bridge Specifications including Supplemental Specifications, Special Provisions, Special Provision Copied Notes, and supplementary reference documents listed in Attachment 1.5a are all part of these Technical Requirements. A requirement occurring in one shall be as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete and compliant Opitz Project. In case of a discrepancy, the following order of priority will apply, with the highest governing item appearing first and the least governing item appearing last:
1. These Technical Requirements and Attachments
 2. Special Provision Copied Notes in Attachment 1.5a, Section B
 3. Special Provisions in Attachment 1.5a, Section B
 4. Supplemental Specifications in Attachment 1.5a, Section B
 5. Standards and Specifications listed in Attachment 1.5a, Section A
 6. Reference Documents listed in Attachment 1.5a, Section C
 7. Standard Drawings (calculated dimensions, unless obviously incorrect, will govern over scaled dimensions) in Attachment 1.5a, Section A
- B. Each party shall promptly notify the other party if it discovers an obvious and plain error or omission in the text of the Technical Requirements attributable to a word processing, administrative or similar oversight. The parties will then coordinate to make such corrections as are necessary to restore the intent of the language.
- C. The standards and specifications, special provisions, and reference guides, including all supplements, errata, revisions, and interims, applicable for the Construction Period shall be the version of those documents as listed in Attachment 1.5a or those in effect as of the final issuance date of the RFP for the Opitz Construction Contract, including all RFP revisions and addenda. It is the responsibility of the Concessionaire to ensure that all relevant standards and specifications have been applied.

1.6 Right of Way

- A. Right-of-way costs will be handled in accordance with the Agreement.
- B. The Concessionaire shall provide right-of-way (ROW) acquisition services for the Opitz Project, as required by the Agreement. ROW acquisition services

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shall include the preparation of ROW plans or plats in accordance with VDOT Location and Design policies and procedures, title examinations, appraisal, appraisal review, negotiations, relocation assistance and advisory services, closings, and legal services. The Concessionaire will coordinate and determine required right-of-way for Utility Relocations and coordinate preparation of all required easement agreements, right-of-way plans and documentation for acquisition and vacation of existing property rights. All appraisers and acquisition firms shall be selected from the Department's pre-approved lists. The Department will retain authority for approving just compensation, relocation benefits, and settlements. The Department must issue a Notice to Commence Right of Way Acquisition to the Concessionaire, before any offers are made to acquire property. The Department must also issue a Notice to Commence Construction to the Concessionaire once the property has been acquired prior to commencing construction on the property. The required right-of-way plans and documentation will be reviewed and approved by the Department and, if necessary, FHWA.

- C. The Concessionaire shall adhere to the requirements set forth in the Right of Way Manual of Instructions, 3rd Edition, FHWA Update January 1, 2016, Chapter 10 (as revised through October 13, 2017) .
- D. The Concessionaire shall be responsible for the Commonwealth Transportation Board (CTB) approval of any change to Limited Access, including but not limited to, the development of supporting documentation and schedule impacts. The Department will be responsible for making the request to the CTB. The Concessionaire shall also be responsible for replacement of Limited Access fence impacted by the Project and where necessary installing new fence for new Limited Access lines.
- E. The Concessionaire shall carry out its responsibilities in accordance with the following requirements:
 - 1. The Concessionaire shall acquire property in accordance with all applicable federal and state laws and regulations, including but not limited to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (the "Uniform Act), and titles 25.1 and 33.2 of the 1950 Code of Virginia, as amended. The acquisition of property shall follow the guidelines as established by the Department and other state and federal guidelines that are required and VDOT's Right of Way Manual of Instructions.
 - 2. The Concessionaire shall submit a project-specific ROW Acquisition Plan, as described in Attachment 1.3, for the Department's review and approval. In the event the Department fails to respond in 21 days, such failure by the Department shall not be deemed approval of the ROW Acquisition Plan.

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3. The Concessionaire shall submit, as part of the ROW Acquisition Plan, procedures for handling ROW acquisitions and relocations to the Department for review and approval before beginning ROW activities. These procedures must show the Concessionaire's methods, including the appropriate steps and workflow required for title examinations, appraisals, and review of appraisals, negotiations, acquisition, and relocation. The Department shall have a period of twenty-one (21) days to review and either approve or refuse said documents, submittals including its review and approval of just compensation, relocation benefits, and administrative settlements.
4. The Concessionaire shall have access to, and use the Department's ROW and Utilities Management System (RUMS) to manage and track the acquisition process, including easements. All entries made into RUMS shall be made in a timely manner to accurately reflect current project status. The Department's standard forms and documents, as found in RUMS, will be used to the extent possible. Any changes to the forms and documents must be approved by the Department. The Department will provide training and technical assistance to the Concessionaire in the use of RUMS.
5. The Concessionaire shall provide a current title examination (no older than 60 days) for each parcel at the time of the initial offer to the landowner. Each title examination report shall be prepared by a Department-approved title company, in accordance with VDOT's Right of Way Manual of Instructions, and shall include title insurance commitment. Should the Concessionaire select a law firm to certify title examinations, the certifying attorney shall provide evidence of professional liability insurance. The Department reserves the right to determine if the professional liability insurance coverage is sufficient. If any title examination report has an effective date that is older than 60 days, an update is required before making an initial offer to the landowner.
6. The Concessionaire shall prepare appraisals in accordance with VDOT's Right of Way Manual of Instructions.
7. The Concessionaire shall provide appraisal reviews complying with technical review guidelines of the Department's appraisal guidelines. The reviewer shall be on the Department's approved fee appraiser list. The Department will review the Concessionaire's appraisal waiver, appraisal, and appraisal review for each parcel, and shall have the decision of final approval of each appraisal and just compensation offer.
8. The Department shall make direct payments to property owners for negotiated settlements and relocation benefits and make deposits with the appropriate court for condemnation cases. Payment

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documentation is to be prepared and submitted with the Acquisition Report (Form RW-24). The Department will process vouchers and issue State Warrants or checks for all payments and send to the Concessionaire who will be responsible for disbursement to the property owner and providing indefeasible title to the Department. The Concessionaire shall be responsible for ensuring that sufficient funds to cover all direct payments are provided to the Department in advance of in advance of submitting the payment documentation and Acquisition Report for each property acquisition.

9. The Concessionaire shall prepare, obtain execution of, and record documents conveying title to such properties to the Commonwealth of Virginia and deliver all executed and recorded general warranty deeds to the Department. For all property purchased in conjunction with the Opitz Project, title will be acquired in fee simple, except that, with the Department's prior written approval, permanent easements may be acquired in lieu of fee simple interest for the construction, maintenance, and use of items such as noise barriers, retaining walls, storm drainage structures, and earthen slopes. All property shall be conveyed to "Commonwealth of Virginia, Grantee" by a Department-approved general warranty deed, free and clear of all liens and encumbrances except encumbrances expressly permitted in writing by the Department in advance. All easements, except for private utility company easements, shall be acquired in the name of "Commonwealth of Virginia, Grantee." Private utility company easements will be acquired in the name of each utility company unless they are acquired by eminent domain in which case they will be acquired in the name of the Commonwealth of Virginia.
10. The Concessionaire shall use its best efforts to settle claims with landowners amicably. The Department shall make the ultimate determination in each case as to whether settlement is appropriate or whether the filing of a condemnation action is necessary. The Concessionaire shall not request the filing of a certificate until the landowner has been given a minimum of 30 days to consider the offer or terminate the negotiations. If, despite the Concessionaire's best efforts, it is unable to reach a settlement with any landowners, as a last resort the Department will handle any necessary condemnation proceedings subject to the following. Prior to the Department filing a condemnation proceeding, the Concessionaire shall prepare or cause to be prepared all necessary paperwork and supporting documentation required for the proceeding and it shall deliver that documentation to the Department, including the notice of filing certificate. The Department will review the submitted documentation for compliance with the Department's rules and regulations, and when approved, will then file the condemnation proceeding(s) and

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handle such proceeding(s) in accordance with VDOT's Right of Way Manual of Instructions.

11. The Office of Attorney General, Commonwealth of Virginia, shall act as the Department's legal counsel and will assign cases to fee counsel and review and approve their billing. Support and testimony for condemnations will be provided by the Concessionaire for a period of 12 months after the final condemnation certificate of take/deposit is recorded.
 12. The Concessionaire shall be responsible for all contacts with landowners for ROW or construction items, prior to initiation of condemnation proceedings by the Department. The Concessionaire will provide documentation of all contact with property owners (including participants and organizations), a summary of discussions, agreed upon items, follow-up activities, and copies of items distributed, including but not limited to appropriate and timely documentation in the RUMS.
 13. The Concessionaire shall use reasonable care in determining whether there is reason to believe that property to be acquired for rights of way may contain concealed or hidden wastes or other materials or hazards requiring remedial action or treatment. When there is reason to believe that such materials may be present, the Concessionaire shall notify the Department within three (3) days. The Concessionaire shall not proceed with acquiring such property until they receive written notification from the Department.
 14. During the acquisition process and for a period of three years after the later of Final Completion or the Commonwealth has indefeasible title to the property, all Opitz Project documents and records not previously delivered to the Department, including design and engineering costs, construction costs, costs of acquisition of ROW, and all documents and records necessary to determine compliance with the laws relating to ROW Acquisition and the costs of relocation of Utilities shall be maintained and made available by Concessionaire to the Department and FHWA for inspection or audit.
- F. The Concessionaire shall be responsible, at its sole expense, for demolishing and disposing of all existing buildings from the ROW and permanent and temporary easements. All such work shall comply with the Standard of Care and these Technical Requirements.
- G. The Concessionaire will exercise the Standard of Care to minimize impacts and damages to property, businesses, and residences, including noise, vibrations, temporary traffic patterns, and clearing of tree buffers. The Concessionaire will address public, business, and government comments in coordination with the Department within 21 days of receipt; however, the

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responsibility to coordinate and address the comments will be the Concessionaire's. Where requested, the Concessionaire will provide stakeout and marking of existing property lines and impacts.

1.7 Utilities

1.7.1 General Requirements

- A. All efforts and costs necessary for all Utility (including the Concessionaire and Department's communications and power cables and conduits) designations, Utility locates (test holes), conflict evaluations, cost responsibility determination, Utility Relocation designs, Utility Relocations and adjustments, Utility reimbursements, determination of existing Utility easements and the inclusion of such easements on plans, replacement land rights acquisition and Utility coordination shall be included in the Concessionaire's cost. Costs for any Utility (including the Concessionaire and Department's communications and power cables and conduits) betterment(s) shall not be included in the Concessionaire's cost but shall be reimbursed directly to the Concessionaire from the Utility Owner through agreement with the requesting Utility Owner.
- B. This is a Department sanctioned project and the Concessionaire shall enjoy all of the benefits and responsibilities of the Department as it pertains to prior rights, statutory rights, or any other right relating to Utility Relocations, subject to the Department's ability to assign those rights.
- C. The Concessionaire is responsible for identifying the owner, type, size, height and number of overhead cables, number of underground cable/conduits, pipes, services, and horizontal and vertical (depth) location of underground utilities to include service connections and laterals with the utility owners.
- D. Prior to Construction Notice to Proceed, the Concessionaire shall coordinate with the Department, its approach to utility coordination for the Opitz Project, including the schedule and proposed activities of the Concessionaire, the anticipated Utility Owners that may be impacted, and the Department and Concessionaire (as owners of other utilities located within the Opitz Project limits) to the level of detail and extent to which such information is known at the time. Such information will be updated from time to time as additional information becomes available during later stages of design, and includes, but is not limited to, assertions of the following:
 - 1. Durations and schedules for planned Utility Relocations have been coordinated with the Utility Owners.
 - 2. Durations for the Utility Relocations by Utility Owners are adequate for the type and scope of services being provided.
 - 3. The use of Float for Utility Relocation activities is in accordance with the Technical Requirements.

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- E. The Concessionaire shall be responsible for all Utility (including the Concessionaire and Department's communications and power cables and conduits) designations, Utility locates (test holes), conflict evaluations, cost responsibility determinations, Utility Relocation designs, Utility Relocations and adjustments, Utility reimbursement, replacement land rights acquisition, Utility coordination, determination of existing Utility easements and the inclusion of such easements on plans, replacement land rights acquisition, and coordination of Utility betterments required for the Opitz Project. The Concessionaire shall be responsible for causing all necessary Utility (including the Concessionaire and Department's communications and power cables and conduits) Relocations, adjustments, and betterments to occur in accordance with the accepted Baseline Schedule.
- F. The Concessionaire shall be responsible for new Utility service connections, including full coordination with the Utility Owners, acquisition of easements and payment of connection fees. The Concessionaire shall also be responsible for paying the monthly Utility bills associated with new service panels, up to and including the Opitz Final Completion Date. Service shall be transferred to either Department or Concessionaire, as applicable, upon the Opitz Final Completion Date.
- G. The Concessionaire shall be responsible for coordinating the Opitz Project construction with all utilities that may be affected (including the Department's communications and power cables and conduits). The Concessionaire shall be responsible for coordinating the work of its Contractors and the various utilities. The resolution of any conflicts between utilities and the construction of the Opitz Project shall be the responsibility of the Concessionaire. No additional compensation or time will be granted for any delays, inconveniences, or damage sustained by the Concessionaire or its subcontractors due to interference from utilities or the operation of relocating utilities or betterments.
- H. If the Concessionaire desires the temporary or permanent adjustment of utilities (including the Department's communications and power cables and conduits) for its own benefit, it shall conduct all negotiations with the Utility Owners and pay all costs in connection with the adjustment.
- I. The Concessionaire shall initiate early coordination with all Utilities (including the Concessionaire and Department's communications and power cables and conduits) located within the Opitz Project limits. The Concessionaire shall identify and acquire any replacement utility easements or required right of way needs of all utilities necessary for relocation due to conflicts with the Opitz Project. The Concessionaire shall coordinate with the Utility Owners to obtain temporary construction easements or agreements.
- J. The Concessionaire shall provide all Utility Owners with roadway/bridge design plans as soon as the plans have reached a level of completeness adequate to allow them to fully understand the Opitz Project impacts. The

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Utility Owners will use the Concessionaire's design plan for preparing relocation plans and estimates. If a party other than the Utility Owner prepares relocation plans, there shall be a concurrence box on the plans where the Utility signs and accepts the relocation plans as shown. The Concessionaire shall be responsible for design and construction for the relocation of any/all communications and power cables and conduits, lightings, ITS devices, generators and service panels owned by the Department as required for the Opitz Project.

- K. The Concessionaire shall coordinate and conduct a preliminary Utility review meeting with all affected Utility Owners to assess and explain the impact of the Opitz Project. The Department's Project Manager and Regional Utilities Manager (or designee) shall be included in this meeting.
- L. The Concessionaire shall schedule and conduct a Utility field inspection for each Opitz Project segment in accordance with the procedures set forth in the VDOT Utility Manual. The Concessionaire will provide meeting minutes for each Utility field inspection.
- M. The Concessionaire shall verify the prior rights of each Utility Owner's facilities if claimed by a Utility Owner. If there is a dispute over prior rights with a Utility, the Concessionaire shall be responsible for resolving the dispute. The Concessionaire should prepare and submit to the Department a preliminary Utility Status Report that includes a listing of all known Utilities located within the Opitz Project limits and a conflict evaluation and cost responsibility determination for each Utility. This report shall include copies of easements, plans, or other supporting documentation that substantiates any compensable rights of the Utility Owner. In addition, a written Utility status update shall be provided monthly to the Department to document the status of coordination.
- N. The Concessionaire shall obtain the following from each Utility that is located within the Opitz Project limits:
 - 1. relocation plans including letter of "no cost" where the Utility does not have a compensable right;
 - 2. utility agreements including cost estimate and relocation plans where the Utility has a compensable right;
 - 3. utility easement forms to be executed by the landowner, if necessary;
 - 4. letters of "no conflict" where the utility's facilities will not be impacted by the Opitz Project; and
 - 5. prepare bridge attachment agreements between the Department and the Utility Owner, if necessary.

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- O. The Concessionaire will use a two-party agreement, similar to the Master Utility Agreement (MUA) utilized by the Department (provided for in the Department's Utility Manual) to establish the general framework for addressing the Utility issues within the Opitz Project affecting a Utility Owner. The two-party agreement between the Concessionaire and the Utility company will set forth the terms and conditions under which the Utility work will be performed, and will adhere to the Department's Utility Manual. Included in the two party agreement, similar to the MUA utilized by the Department (provided for in the Department's Utility Manual), will be the statement (with reference to the Agreement) that this work is being performed as a Department project. Preparing all agreements relative to the Utility Relocation is to be between the Concessionaire and the Utility. This includes the agreements for authorization to relocate facilities as well as any reimbursement terms/agreements.
- P. The Concessionaire shall review all relocation plans to ensure that relocations comply with VDOT Utilities Manual of Instruction, the Utility Relocation Policies and Procedures and VDOT's Land Use Permit Regulations. The Concessionaire shall also ensure that there are no conflicts with the proposed roadway improvements, and ensure that there are no conflicts between each of the Utility Owner's relocation plans. The Concessionaire shall prepare and submit to the Department all relocation plans. The Concessionaire is expected to assemble the information included in the relocation plans in a final and complete format and in such a manner that the Department may approve the submittals with minimal review. The Concessionaire shall meet with the Department's Regional Utilities Manager to gain a full understanding of what is required with each submittal. The Concessionaire shall receive written approvals from the Department prior to authorizing Utilities to commence relocation construction. The Utility Owners shall not begin their relocation work until authorized by the Concessionaire. Each relocation plan submitted must be accompanied by a certification from the Concessionaire stating that the proposed relocation will not conflict with the proposed roadway improvement and will not conflict with another Utility Owner's relocation plan.
- Q. The Department will provide reasonable assistance in negotiations with Utility Owners and will provide available Department documents concerning prior rights in a timely manner as requested by the Concessionaire, but the Department shall incur no liability in providing such reasonable assistance and shall not be required to initiate or participate in any legal action other than as a witness or to produce documents.
- R. The Concessionaire shall make all reasonable efforts to design the Opitz Project to avoid conflicts with Utilities, and minimize impacts where conflicts cannot be avoided. The Concessionaire shall be responsible for ensuring that Utility service interruptions are minimized.

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- S. The Concessionaire shall ensure the Utility Owners submits as-built drawings and Land Use Permit applications upon completion of its relocation and (or) adjustments. The Department will issue an as-built permit to the Utility Owners within 21 days of receipt of as-built drawings and Land Use Permit applications.
- T. The Concessionaire shall be responsible for ensuring the appropriate abandonment or removal of all abandoned Utilities (including the Concessionaire and Department's communications and power cables and conduits) within the Opitz Project ROW.
- U. At the time that the Concessionaire notifies the Department that the Concessionaire deems the Opitz Project to have reached Final Completion, the Concessionaire shall certify to the Department that all Utilities have been identified and conflicts have been resolved and that those Utilities with compensable rights or other claims related to relocation or coordination with the Opitz Project have been relocated and their claims and compensable rights satisfied or will be satisfied by the Concessionaire.
- V. The Concessionaire shall accurately show the final location of all Utilities (including the Concessionaire and Department's communications and power cables and conduits) on the As-Built Plans in accordance with Section 3.18 of these Technical Requirements.
- W. The Concessionaire shall be responsible for ensuring that each utility owner that is subject to the requirements of Section 313 of Title 23 United States Code, MAP-21 S.1518 Buy America provides written certification to the Concessionaire that they are in compliance with this requirement. If the Concessionaire or its subcontractors are installing the utility relocations then the Concessionaire shall provide the certification pre-installation, along with any other Contractor installed items for the Project; if the utility owner/company is installing the utility relocation then the certification shall be provided post-installation. Compliance documentation must be furnished for the Concessionaire to be reimbursed for the Work. For any utility betterments where Project funds are being applied, the Work must meet the Buy America requirements.

1.7.2 Concessionaire's Responsibility for Utility Property and Services

- A. At points where the Concessionaire's operations are on or adjacent to the properties of any Utility, including railroads, (including the Department's communications and power cables and conduits), and damage to which might result in expense, loss, or inconvenience, Work shall not commence until arrangements necessary for the protection thereof have been completed. The Concessionaire shall cooperate with owners of Utilities so that:
 - 1. removal and adjustment operations may progress in a timely, responsible, and reasonable manner,

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2. duplication of adjustment work may be reduced to a minimum, and services rendered by those parties will not be unnecessarily interrupted.
- B. If any Utility (including the Concessionaire's and the Department's communications and power cables and conduits) service is interrupted as a result of accidental breakage or of being exposed or unsupported, the Concessionaire shall promptly notify the proper authority and shall cooperate fully with the authority in the restoration of service. If Utility service is interrupted, repair work shall be continuous until service is restored.
 - C. The Department's TMS fiber optic communication lines and associated electrical distribution lines are located throughout the Opitz Project limits in conjunction with other public utilities. These TMS utilities will not be marked by Miss Utility. The Concessionaire shall exercise care to prevent damage or disruption to the TMS. However, in the event the Concessionaire and/or its contractor(s) damage the TMS due to his operations, the Concessionaire shall immediately notify the McConnell Public Safety and Transportation Operations Center (PSTOC) as well as the Department Project Manager and cease all construction operations until repairs are completed and the system is fully operational. Except as set forth in the Agreement, the Concessionaire will be responsible for all cost necessary for repair and any time impact to the Opitz Project.
 - D. The Concessionaire shall comply with all requirements of the Virginia Underground Utility Damage Prevention Act (the Miss Utility law).
 - E. The Department's facilities including roadway lighting cable and conduit, traffic management systems cable and conduit as well as Department owned fiber optic lines are not marked by the Miss Utility. Therefore, the Concessionaire may either elect to use, at its own discretion and cost, the Department on-call consultant or alternatively use a different, competent contractor/consultant familiar with Department owned utilities. It is the Concessionaire's sole responsibility to have these utilities marked, maintain the markings throughout the life of the Opitz Project as well as assume physical and financial arrangements to have these utilities marked/re-marked. The Concessionaire will be responsible for all cost necessary for these utility markings.
 - F. The Concessionaire shall determine whether other Utilities are present in addition to those identified by the VDOT Notification Center Report and shall afford those additional Utilities an equivalent notification protocol.

1.7.3 Restoration of Work Performed by Others

- A. The Department may construct or reconstruct any Utilities within the limits of the Opitz Project or grant a permit for the same at any time.

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- B. Subject to any relief to which the Concessionaire may be entitled to in the Agreement, when authorized by the Department, the Concessionaire shall allow any person, firm, or corporation to make an opening in the highway within the limits of the Opitz Project upon presentation of a duly executed permit from the Department or any municipality for sections within its corporate limits.

1.8 Work Restrictions

1.8.1 General Requirements

- A. The Concessionaire shall be responsible for a Transportation Management Plan (TMP) for the Opitz Project (the “Opitz Project TMP”) in accordance with Section 1.9.3 of these Technical Requirements.
- B. The Concessionaire’s traffic control for the Work shall be consistent with the Agreement, including these Technical Requirements.
- C. The Concessionaire is responsible for the safety of the work zone. The Concessionaire shall appoint a single point of contact to address traffic control requirements for the work zone in accordance with Section 1.9.1.
- D. The Concessionaire shall conduct all work necessary to provide safe and efficient traffic operations during construction, including provisions for the movement of people, goods, and services through and around the Opitz Project while minimizing impacts to pedestrians, bicyclists, local residents, businesses, and commuters. In no event shall sidewalks or shared use paths be closed unless first approved by the Department, considering planned and designed alternative facilities by the Concessionaire.
- E. The Concessionaire shall coordinate construction and traffic control activities that impact transit services with the impacted transit agencies.

1.8.2 Work Hours

- A. The Concessionaire is advised that its general operations may proceed seven days a week, 24 hours a day, except as may be modified herein.
- B. This is contingent upon the Concessionaire obtaining a variance or waiver of all applicable noise restrictions, as stated in the Agreement.

1.8.3 Temporary Roadway Closures

- A. Anticipated and proposed temporary lane and/or shoulder closures shall be reviewed and approved by the Concessionaire (for the Express Lanes) or the Department (for the General Purpose lanes and other state roadways). The Concessionaire shall restore all lanes of traffic per the times specified in this section. Restoration of traffic shall mean the completion of all construction

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work, the removal of all temporary traffic control devices, signs, workers, materials, and equipment from the roadway. To facilitate construction and minimize inconvenience to the public, the Concessionaire is advised of the closure limitations listed in the Technical Requirements. The Department reserves the right to modify the closure limitations in the Technical Requirements, and any modification shall be handled under Section 1.8.6 – Allowance for Additional Lane Closure Restriction by the Department and/or Concessionaire Request for Additional Lane Closures.

B. Allowable Lane Closure Hours

INTERSTATE 395 & INTERSTATE 95					
WEEKDAY		Northbound			
		Single-Lane Closures or Shoulder	Two-Lane Closures	Multiple-Lane Closures	Complete Road Closure
Segment 1	14 th St. Bridge to Springfield Interchange	10:00AM to 3:00PM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 4:00AM
		9:00PM to 5:00AM			
Segment 2	Springfield Interchange to Rt.123	9:30AM to 3:30PM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 4:00AM
		9:00PM to 5:00AM			
Segment 3	Rt.123 to Prince William / Stafford County line	9:30AM to 3:30PM	10:00PM to 4:30AM	11:00PM to 4:00AM	12:00AM to 4:00AM
		9:00PM to 5:00AM			
Segment 4	Prince William / Stafford County line to Rt.3 Exit 130	9:30AM to 3:30PM	10:00PM to 4:30AM	n/a	12:00AM to 4:00AM
		9:00PM to 4:30AM			
Segment 5	Rt.3 Exit 130 to Caroline / Hanover County line	9:00AM to 3:30PM	10:00PM to 4:30AM	n/a	12:00AM to 4:00AM
		9:00PM to 5:30AM			
All lanes open at 12:00 noon on Friday					
WEEKDAY		Southbound			
		Single-Lane Closures or Shoulder	Two-Lane Closures	Multiple-Lane Closures	Complete Road Closure
Segment 1	14 th St. Bridge to Springfield Interchange	10:00AM to 2:30PM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 4:00AM
		9:30PM to 5:00AM			
Segment 2	Springfield Interchange to Rt.123	9:00AM to 2:00PM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 4:00AM
		9:30PM to 5:00AM			
Segment 3	Rt.123 to Prince William / Stafford County line	9:00AM to 2:00PM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 4:00AM
		9:30PM to 6:00AM			
Segment 4	Prince William / Stafford County line to Rt.3 Exit 130	9:00AM to 2:00PM	10:00PM to 5:30AM	n/a	12:00AM to 4:00AM
		9:30PM to 6:00AM			
Segment 5	Rt.3 Exit 130 to Caroline / Hanover County line	9:00AM to 3:00PM	10:00PM to 5:30AM	n/a	12:00AM to 4:00AM
		9:30PM to 6:00AM			
All lanes open at 11:00am on Friday					

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INTERSTATE 395 & INTERSTATE 95			
WEEKEND	Northbound/Southbound*		
	Single-Lane Closures or Shoulder	Multiple-Lane Closures	Complete Road Closure
Friday to Saturday	10:00PM to 7:00AM	11:00PM to 6:00AM	12:00AM to 5:00AM
Saturday to Sunday	10:00PM to 7:00AM	11:00PM to 6:00AM	12:00AM to 5:00AM
Sunday to Monday	10:00PM to 5:00AM	11:00PM to 4:00AM	12:00AM to 4:00AM

* For special operations, depending on time of year, additional hours may be allowed with proper ADA/ROD approval.

REVERSIBLE LANES (HOV & EXPRESS LANES)*		
	Single-Lane Closures or Shoulder	Complete Road Closure**
WEEKDAY	9:30PM (Sunday to Thursday) to 4:00AM (Monday to Friday)	11:00PM to 4:00AM
WEEKEND	11:00PM (Friday to Saturday) to 9:00AM (Saturday to Sunday)	11:00PM to 4:00AM

* Direction of traffic control for all lane closures in reversible lanes will need to be adjusted as necessary to face direction of traffic.
 ** Complete Road Closure on Express Lanes limited to 30 minutes or less.

Single-Lane Closures* or Shoulder					
ARTERIAL	WEEKDAY		WEEKEND		
	Monday to Thursday	Friday	Friday to Saturday	Saturday to Sunday	Sunday to Monday
Major Arterials**	9:30AM to 3:00PM	9:30AM to 2:00 PM	10:00PM to 9:00AM	10:00PM to 8:00AM	10:00PM to 5:00AM
	10:00PM to 5:00AM				
All Other Roadways	9:00AM to 3:30PM	9:00AM to 2:00 PM	10:00PM to 9:00AM	9:00PM to 9:00AM	10:00PM to 5:00AM
	9:00PM to 5:00AM				

Multiple-Lane Closures					
ARTERIAL	WEEKDAY		WEEKEND		
	Monday to Thursday	Friday	Friday to Saturday	Saturday to Sunday	Sunday to Monday
Major Arterials**	10:00PM to 5:00AM	Not allowed until 11:00PM	11:00PM to 5:00AM	11:00PM to 6:00AM	11:00PM to 5:00AM
All Other Roadways	9:00PM to 5:00AM	Not allowed until 10:00PM	10:00PM to 6:00AM	10:00PM to 6:00AM	10:00PM to 5:00AM

*Single-lane closures only permitted for multiple-lane roadways.

**Major Arterials defined as Primary Roads, high volume Secondary Roads, and all other routes that connect directly to Interstates.

- C. These allowable hours shall be applicable to both stationary and mobile lane closures, as well as shoulder closures.
- D. Both left and right shoulders on I-95 GP lanes shall not be closed at the same time.
- E. Lane Closure Request Procedure
 - 1. Multi-lane closures of I-95 for any Work will require coordination with appropriate Governmental Authorities, stakeholders and public notice. The Concessionaire shall provide a minimum of three (3) weeks advance notice to the Department. This advance notice will allow the Department and Concessionaire to coordinate on a public outreach campaign and/or advertising to reach affected motorists and target audiences. Alternate dates can be advertised in the event of inclement weather.

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2. Total closures of I-95 for any surface, overhead, or underground work will require coordination with appropriate Governmental Authorities, stakeholders and public notice. Total roadway closures shall be limited to no more than 30 minutes maximum. Closures beyond 30 minutes shall require approval by the Department, subject to review of any required TTC plans and/or detour plans. The Concessionaire shall provide a minimum of six (6) weeks advance notice to the Department. This advance notice will allow the Department and Concessionaire to coordinate on a public outreach campaign and/or advertising to reach affected motorists and target audiences. Alternate dates can be advertised in the event of inclement weather.
 3. The Concessionaire shall be responsible for submitting all lane and/or shoulder closures into LCAMS at least ten (10) days in advance of the proposed lane and/or shoulder closure(s) and no later than close of business Wednesday the week prior to the closure stating the location, purpose, specific lane(s) to be closed, time and duration of closure. Any conflicts generated from LCAMS shall be resolved no later than close of business Thursday the week prior to the closure to avoid cancellation of the lane closure request. The Concessionaire shall also be responsible for entering lane closure requests in VDOT systems such as VaTraffic, LCAMS, and VA511.
 4. The Concessionaire is responsible for providing advance notification via variable message and required static signing for lane and/or shoulder and complete road closures in accordance with the Virginia Work Area Protection Manual and the *Manual on Uniform Traffic Control Devices* (MUTCD). Once a lane or shoulder closure is in place, Work shall commence immediately and shall progress on a continuous basis to completion or to a designated time.
- F. Refer to the Liquidated Damages as per Section 1.8.13 of these Technical Requirements, for situations where the Concessionaire is unable to remove the lane and/or shoulder closure by the stipulated time.
- G. The Department reserves the right to monitor traffic conditions impacted by the Work and to make necessary restrictions as may be warranted or as Emergency situations dictate. Additional restrictions for other holidays or special local events may also be necessary, however, in these situations the Department will endeavor to inform the Concessionaire of any additional restrictions as early as practicable and in no case less than forty-eight (48) hours prior to the holiday or special local event.
- H. Confirmation shall be made 24 hours before any scheduled lane closure and shall include a written reiteration of the proposed tasks and a listing of materials, labor, and major equipment to be used. Complete road closures require a 72-hour advance confirmation for coordination. The Concessionaire

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is responsible for providing adequate advance notification via variable message and required static signing for lane closures in accordance with the Virginia Work Area Protection Manual (VWAPM) and the Manual on Uniform Traffic Control Devices (MUTCD). Once a closing is in place, Work shall begin immediately and shall progress on a continuous basis to completion or to a designated time. The closure may be delayed if excessive traffic backup or queuing is already present at the scheduled start of Work and will be adjusted in accordance with these Technical Requirements.

- I. Traffic backups must dissipate before successive closings can be implemented.
- J. The minimum clear distance between two separate lane closings, that is, from the last traffic cone of the first closing to the first traffic cone of the second closing in the same roadway, shall be two miles.

1.8.4 Reversible Facilities

A. Hours of Operations

The existing reversible facility hours of operations shall remain in place during of the Construction Period, unless otherwise specified by the Department with adequate advance notice to the Concessionaire. During the Construction Period, the Concessionaire shall be responsible for the operation of the existing reversible facility, including gate operations and reversal of the flow of traffic. The Concessionaire shall be responsible for scheduling all Work to accommodate the reversal schedule. This shall include adjustment of all temporary traffic controls as necessary to be consistent with the direction of traffic.

1.8.5 Lane Closure Types

- A. All lane closures shall be identified as one of the following types:
 - 1. Type 1 – A lane closure resulting in a significant impact on traffic, such as stopping traffic completely, closing two or more lanes, any lane closures in the existing reversible facility, closing an exit or entrance ramp at freeway interchanges or changing traffic patterns. This type of closure would require extensive media and stakeholder notification and coordination among various local and state agencies.
 - 2. Type 2 – A lane closure resulting in minor or no impact on the flow of traffic, such as closing one lane on a four-lane roadway during off-peak traffic hours.
 - 3. Type 3 – A lane closure that would close a shoulder (right or left) on a roadway or ramp.

1.8.6 Allowance for Additional Lane Closure Restriction by the Department and/or Concessionaire Request for Additional Lane Closures

- A. At the Department's reasonable discretion and approval, the Concessionaire may submit a request to Work outside the stated lane closure hours by providing adequate justification (including traffic analysis) demonstrating the viability of the request.
- B. Closures of longer durations than those specified in these Technical Requirements will require a review of plans, implementation of detours, and public outreach.
- C. The Department reserves the right to monitor traffic conditions affected by the Work and to make additional restrictions as may be necessary, such as terminating a lane closure early or adjusting the Opitz Project's allowable lane closure hours.
- D. General Requirements:
 - 1. The Department will track any additional lane closure time granted outside of time allowed in the Agreement.
 - 2. Any additional time granted must comply with all the requirements set forth in the Agreement.
 - 3. The Concessionaire acknowledges that there will be instances where the Concessionaire may not be allowed to implement an approved lane closure during events that are beyond the Department's control.
 - 4. The Department will track all instances where the Concessionaire is directed by the Department not to implement any lane closures for special events such as, but not limited to, the following list:
 - i. Presidential motorcades traveling through project limits
 - ii. Special events with regional impacts
 - iii. Special sport events with regional impacts
 - iv. Major accidents/Incidents with regional impacts
 - v. Seasonal traffic patterns
- E. Calculating Hours:
 - 1. Additional time (lane closures) – Any additional time requested by the Concessionaire and granted by the Department beyond the approved hours within the Agreement will be added for every instance and every location at 15 minute intervals.

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2. Additional Time (complete closures) – If a full closure of roadway not specified in the Agreement is implemented in lieu of 30 minute total temporary closure, hours will be calculated in the same manner as the hours that were requested/approved for the specific closure.
3. Time Deducted – When the Concessionaire is not allowed to implement a lane closure by the Department during the approved hours within the Agreement, the hours during which such lane closure is not allowed will be deducted from the total hours accumulated.

F. Documentation:

1. Within the first 60 days, the Department and Concessionaire will develop and agree on a format of documenting this information. The form should at least contain date, hours allowed, hours disallowed, impacted time and other agreed upon elements.
2. By the 10th of each month, the Department and Concessionaire will reconsolidate and agree on the resultant amount of hours allowed/disallowed.

G. Allowance:

1. At the end of the Opitz Project, the Department and the Concessionaire will reconcile the resultant impacted time or additional granted time by subtracting the additional time granted by the Department from the time Concessionaire was disallowed per the Technical Requirements in accordance with the Agreement to implement the lane closures. The Department and Concessionaire will endeavor to maintain a neutral balance of resultant impacted and additional granted time throughout the duration of the Opitz Project.
2. Any lane closures affected by inclement weather, snow and snow removal process, Emergency Department maintenance repairs safety shutdowns and from major accidents are not subject to above allowance and are excluded from the calculations and compensations.

H. General

Notwithstanding anything to the contrary, it is agreed that:

1. The Department will provide the Concessionaire with as much notice as is possible with respect to any lane closure request by the Concessionaire which is not approved by the Department.
2. The Concessionaire will provide the Department with as much notice as is possible with respect to any inability of the Concessionaire to

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implement lane closures which are otherwise allowed within the Agreement.

3. At the end of the Opitz Project, the Department and the Concessionaire will reconsolidate the impacted time by subtracting the additional time granted by the Department from the time the Concessionaire was disallowed per the technical requirements to implement the lane closures. If the Department disapproves requests for lane closures from Concessionaire, or otherwise prevents Concessionaire from implementing lane closures which are otherwise permitted by the Agreement, and the impact of such actions by the Department is more than 120 cumulative hours, such actions shall constitute a Department Change Order.

1.8.7 Night Work

- A. In areas where Work is to be performed during the hours of dusk or darkness, the Concessionaire shall furnish, place, and maintain lighting facilities capable of providing light of sufficient intensity to facilitate good workmanship and proper inspection at all times. The lights shall be arranged so as not to interfere with or impede traffic approaching the work site(s) from either direction or produce undue glare to property owners.
- B. Lighting of work site(s) may be accomplished using any combination of portable floodlights, standard equipment lights, existing street lights, and temporary street lights that will provide the proper illumination.
- C. The Concessionaire shall furnish and place warning signs to alert approaching motorists of lighted construction area(s). These warning signs shall be four feet (1200 mm) x four feet (1200 mm). The Concessionaire's vehicles used on the Opitz Project shall be provided with amber flashing lights that shall be in operation while in the work area. The Concessionaire's equipment shall be provided with a minimum of three square feet of reflective sheeting that is visible to approaching motorists. The Concessionaire shall provide his personnel with proper Personal Protective Equipment (PPE), which shall be worn at all times while the workers are within the work area. The Concessionaire shall provide a light meter to demonstrate that the minimum light intensity is being maintained.
- D. The Concessionaire shall provide sufficient fuel, spare lamps, generators, and other necessary equipment to maintain the lighting of the work site. The Concessionaire shall utilize padding or shielding or locate mechanical and electrical equipment to minimize noise generated by lighting operations as directed by the Department. Noise generated by portable generators shall comply with all Law.
- E. For nighttime work zones involving I-95 travel lanes and ramps (including 95 Express Lanes and ramps), the Concessionaire shall provide a Virginia State

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Police officer with a law enforcement vehicle equipped with a blue flashing light within the work zone in accordance with the VWAPM. For all other roadways and daytime applications, the use of law enforcement shall comply with minimum VWAPM requirements. In the event the Virginia State Police have been given reasonable advance notice of such request but are unable to provide coverage, the Concessionaire may utilize other law enforcement agencies

1.8.8 Law Enforcement Utilization

- A. The Concessionaire shall be responsible for all costs and for coordinating directly with the Virginia State Police service during temporary traffic control operations involving lane closures and/or rolling lane closures, and any other operation as covered in Appendix C of the Virginia Work Area Protection Manual.

1.8.9 Size and Weight Limitations

- A. Hauling or Moving Material and Equipment on Public Roads Open to Traffic: The Concessionaire shall comply with legal size and weight limitations in the hauling or moving of material and equipment on public roads open to traffic unless the hauling or moving is covered by a hauling permit.
- B. Hauling or Moving Material and Equipment on Public Roads Not Open to Traffic: The Concessionaire shall comply with the legal weight limitations in the hauling or moving of material and equipment on public roads that are not open to traffic unless the hauling or moving is permitted elsewhere herein or is otherwise covered by a hauling permit. The Concessionaire shall be liable for damage that results from the hauling or moving of materials and equipment.
- C. The hauling or moving of material and equipment on the final road surface or across any structure during various stages of construction shall be subject to engineering analysis and approved by the Department.
- D. Furnishing Items in Component Parts of Sections: If the size or weight of fabricated or manufactured items together with that of the hauling or moving vehicle exceeds the limitations covered by hauling permit policies and other means of transportation are not available, permission will be given to furnish the items in component parts of sections with adequately designed splices or connections at appropriate points. Permission for such adjustments shall be requested in writing, and approval in writing shall be secured from the Department prior to fabrication or manufacture of the items. The request shall state the reasons for adjustment and shall be accompanied by supporting data, including working drawings where necessary.

1.8.10 Use of Explosives

- A. Explosives shall be stored and used in a secure manner. Prior to prosecuting the Work, the Concessionaire shall conduct an on-site review of the Work involved and develop a plan of operations for performing excavating work. Where feasible, the Concessionaire shall explore other means of loosening and or reducing the size of the excavation without blasting. When blasting becomes necessary, the Concessionaire's plan of operations shall include a blasting plan detailing the blasting techniques to be used during excavation operations requiring the use of explosives. Both plans shall be submitted to the Department for review prior to commencing blasting operations.
- B. Explosives shall be purchased, transported, stored, used, and disposed of by a Virginia Certified Blaster in possession of a current criminal history record check and commercial driver's license with hazardous materials endorsement and a valid medical examiner's certificate.
- C. The Concessionaire shall be responsible for damage resulting from the use of explosives. The Concessionaire shall notify each property and Utility Owner having a building, structure, or other installation above or below ground in proximity to the site of the Work of its intention to use explosives. Notice shall be given sufficiently in advance of the start of blasting operations to enable owners to take steps to protect their property. The review of the Concessionaire's plan of operations, blasting plan, and notification of property owners shall in no way relieve the Concessionaire of its responsibility for damage resulting from its blasting operations.

1.8.11 Not Used

1.8.12 Holidays

- A. Moving/mobile, short duration, short-term stationary, or intermediate-term stationary temporary traffic control zone lane closures on mainline lanes, shoulders, or ramps shall not be performed during the following Holiday time periods without the written permission of the Department. Additionally, a long-term stationary temporary traffic control zone shall not be initially put in place, adjusted, or removed during the following Holiday time periods without the written permission of the Department:
 - **January 1:** From noon on the preceding day until noon on the following day, except as indicated in Section 1.8.12.B below.
 - **Inauguration Day:** From noon on the preceding day until noon on the following day.
 - **Martin Luther King, Jr. Day:** From noon on the preceding Friday to noon on the following Tuesday.

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- **Presidents Day:** From noon on the preceding Friday to noon on the following Tuesday.
 - **Easter:** From noon on the preceding Friday to noon on the following Monday.
 - **Memorial Day:** From noon on the preceding Friday to noon on the following Tuesday.
 - **Juneteenth:** From noon on the preceding day until noon on the following day, except as indicated in Section 1.8.12.B below.
 - **July 4:** From noon on the preceding day until noon on the following day, except as indicated in Section 1.8.12.B below.
 - **Labor Day:** From noon on the preceding Friday to noon on the following Tuesday
 - **September 11:** No daytime closures.
 - **Indigenous Peoples' Day:** From noon on the preceding Friday to noon on the following Tuesday.
 - **Election Day** (the Tuesday following the first Monday in November): No daytime closures.
 - **Veterans Day:** From noon on the preceding day until noon on the following day, except as indicated in Section 1.8.12.B below.
 - **Thanksgiving Day:** From noon on the Wednesday preceding Thanksgiving Day until noon on the following Monday.
 - **Christmas Day:** From noon on the preceding day until noon on the following day, except as indicated in Section 1.8.12.B below.
- B. If the Holiday occurs on a Friday or Saturday, closures shall not be performed from noon on the preceding Thursday to noon on the following Monday. If the Holiday occurs on a Sunday or Monday, closures shall not be performed from noon on the preceding Friday to noon on the following Tuesday.

1.8.13 Damage Recovery for Lane Closures

- A. Damage recovery/user costs will be assessed against the Concessionaire if all lanes are not open to traffic during the times required in the approved request for temporary lane closure. Costs will be assessed as follows and continue until all lanes are opened as determined by the Department. This assessment will be in accordance with the following table:

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Liquidated Damages for Lane Closures			
Liquidated Damage (\$ per minute)			
Elapsed Time (min)	<u>I-95, and all ramps which includes General Purpose Lanes, HOV, and HOT Lanes</u>	<u>Major Arterials</u>	<u>All other roads</u>
1-5, or any portion thereof	\$0	\$0	\$0
Every additional minute or any portion thereof after initial 5 minutes stated above	\$1,000 for the sixth minute plus \$1,000 per each additional minute	\$1,000 for the sixth minute plus \$500 per each additional minute	\$500 for the sixth minute plus \$500 per each additional minute

The liquidated damage charges are set forth in the above table. If a Non-Permitted Closure occurs, the Department will notify the Concessionaire thereof and of the amount of associated Lane Closure Damages in writing within 48 hours of the Non-Permitted Closure. If there are no additional Non-Permitted Closures occurring within 90 days, the Department shall refrain charging of the Lane Closure Damages for the prior Non-Permitted Closures. Otherwise, the Concessionaire shall pay all Lane Closure Damages to the Department within 30 days of the date on which last written notice of Lane Closure Damages is given to the Concessionaire for violating having two (2) or more Non-Permitted Closure occurrences within 90 days. Once there is a clean period of 90 days without a Non-Permitted Closure occurrence, the new 90 days period will start for future Lane Closure Damages. All liquidated damage charges will be capped at \$100,000 per violated Non-Permitted Closure. For avoidance of doubt, the Concessionaire shall pay all Lane Closure Damages to the Department for Non-Permitted Closures that occur on all roadways except for the Non-Permitted Closures occurring within the 95 Express Lanes. If there are Non-Permitted Closures that occur on the 95 Express Lanes and another adjoining roadway, the Concessionaire shall be responsible for 50% of the resulting Lane Closure Damages.

Non-Permitted Closure: Any lane closure outside the Technical Requirements unless approved by the Department.

- B. In addition to the assessed damage recovery/user fees for failure to restore traffic lanes, the Concessionaire will not be allowed further lane closures until the reason for the failure are evaluated and the Concessionaire can provide assurance that the causes have been corrected. A formal submission as to the reasons for the failure to restore traffic lanes within the contract lane closure restrictions and the proposed corrective measures is to be provided to the Department within two (2) days of the occurrence. The Department will respond to the adequacy of the submission within two (2) working days of receipt. No modification of the Contract Price or Contract time(s) will be granted or considered for these days.

- C. The Department may, at its sole discretion, choose not to assess damage recovery/user fees for failure to open traffic if such cause is not related to or caused by the Concessionaire's operations. The Concessionaire shall catalog user cost assessments on a daily basis and submit a tabulation along with certification from the QAM that such tabulation is correct to the Department for concurrence. The Department will make a deduction in the assessed amount from funds otherwise due to the Concessionaire under the Agreement.

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- D. The Department reserves the right to monitor traffic conditions affected by the Work and to make additional restrictions as may be necessary, such as terminating a lane closure early. These adjustments shall be handled under Section 1.8.6 – Allowance for Additional Lane Closure Restriction by the Department and/or Concessionaire Request for Additional Lane Closures.

1.8.14 Not Used

1.8.15 Not Used

1.9 Maintenance of Traffic (Traffic Control)

1.9.1 General Requirements

- A. Temporary traffic control (TTC) plans development shall be consistent with the Agreement, including these Technical Requirements.
- B. Work zone information shall be shared with the Department’s Northern Region Operations Advanced Traffic Management System (ATMS) and any other regional ATMS and shall be approved by the Department.
- C. The Concessionaire shall provide an MOT Manager to perform the following:
 - 1. Coordinate implementation of the Opitz Project TMP as developed by the Concessionaire;
 - 2. Oversee the implementation of the TTC plans;
 - 3. Coordinate temporary traffic control activities with the public/community outreach staff and the Department;
 - 4. Implement traffic management strategies; and
 - 5. Be continuously available during construction until Final Completion of the Opitz Project and elimination of all temporary traffic controls.
- D. The MOT Manager shall be Advanced Work Zone Safety certified and have completed the necessary training on the proper practices and methods for the installation, maintenance and removal of temporary traffic controls; and shall demonstrate traffic control implementation experience of similar project scope and complexity.
- E. The Concessionaire shall prepare traffic analyses and modeling for all temporary traffic phases and stages, exclusive of short-term closures identified in the Agreement, in order to identify traffic impacts. The Concessionaire shall use analytical/deterministic (Highway Capacity Manual-based) or traffic simulation/optimization tools for the analyses. Traffic analyses and modeling

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shall also be required for all construction activities requiring a detour, requiring closure of multiple lanes, or deviating in any way from what is set forth in the Agreement.

- F. Traffic analyses will vary depending on the magnitude of the closure, detour or other change. The scope of the traffic analyses and the assumptions to be used will be determined in a meeting held with the Department.
- G. All TTC plans and documents shall have a valid digital professional engineering stamp held by the TTC plans design engineer whom shall be licensed as a Professional Engineer in the Commonwealth of Virginia and shall demonstrate TTC plans design experience of similar project scope and complexity.

1.9.2 Maintenance of Traffic during Construction

- A. The MOT Manager shall be continuously available for traffic control related activities during construction until Final Completion and elimination of all temporary traffic controls.
- B. The construction activities will be completed in accordance with the Opitz Project TMP, as defined in Section 1.9.3, and with the requirements of the Agreement. VDOT's Instructional and Information Memorandum IIM-LD-241 (Work Zone Safety and Mobility) and Traffic Engineering Memorandum TE 350.1 (Work Zone Speed Analysis) will apply for work zones on the Opitz Project.
- C. The Concessionaire shall conduct daily and weekly MOT/traffic control inspections to ensure all traffic devices and traffic patterns are in compliance with the VWAPM and MUTCD standards. Provide a weekly MOT report to the Department to include the following:
 - 1. Date discrepancy was identified
 - 2. Description of discrepancy
 - 3. Corrective action required
 - 4. Date corrective action should be taken
 - 5. Date corrective action was completed
- D. The Concessionaire shall develop TTC plans for each stage of construction that shows the Concessionaire's proposed construction staging and traffic control devices consistent with the Opitz Project TMP.
- E. The Concessionaire, at its sole cost and expense, will be required to provide a uniformed law enforcement officer with a marked law enforcement vehicle

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equipped with a blue flashing light during set-up and take-down of all daytime intersection closures involving two or more lanes of traffic.

- F. Detour plans shall be developed by the Concessionaire and presented to the Department for approval. The Concessionaire shall coordinate detour plans with local, state and federal agencies (as applicable), and submit the detour plan well in advance of any planned detour activity. The Concessionaire shall be responsible for all planning, consultation and coordination with impacted parties, design, implementation and monitoring, and maintenance of detours-whether within or outside the Opitz Project Right of Way. The provision of detours and marking of alternate routes will not relieve the Concessionaire of the responsibility for ensuring the safety of the public or from complying with any requirements of the Agreement.
- G. The Concessionaire shall be responsible for design and construction of any additional improvements that may be needed on alternate routes based on the traffic analyses and coordination with the Department.
- H. Right of way for temporary highways, diversion channels, sediment and erosion control features or bridges required by the Technical Requirements will be planned, designed and provided by the Concessionaire.
- I. During any suspension of Work, the Concessionaire shall temporarily open to traffic such portions of the Opitz Project and temporary roadways as may be agreed upon by the Department and Concessionaire.
- J. Unless a design exception or design waiver is granted, the geometric design for temporary roadways and temporary traffic control shall be designed, at a minimum, to the existing posted speed limit.
- K. Certified flaggers shall be provided in sufficient number and locations as necessary for control and protection of vehicular and pedestrian traffic in accordance with the requirements of the Virginia Work Area Protection Manual (VWAPM). Flaggers shall be able to communicate to the traveling public in English while performing the job duty as a flagger at the flagger station. Flaggers shall use sign paddles to regulate traffic in accordance with the requirements of the VWAPM. Flagger certification cards shall be carried by flaggers while performing flagging duties. Flaggers found not to be in possession of their certification card shall be removed from the flagging site and operations requiring flagging will be suspended. Further, flaggers performing duties improperly will have their certifications revoked.
- L. Restrictions on lane closures are defined in the Agreement.
- M. Long-term closures of the shoulders adjacent to the general purpose lanes are allowable provided the closure is separated by concrete barrier as approved by the Department.

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- N. Where concrete barriers are used to close the shoulder, the Concessionaire will be required to provide pull off areas in accordance with the Virginia Work Area Protection Manual.
- O. Connections with roads and public and private entrances shall be kept in a reasonably smooth condition at all times. Stabilization or surfacing material shall be applied to connections and entrances.
- P. The Concessionaire shall schedule construction operations so that approved continuous access is provided for all roads and properties. Connections or entrances shall not be disturbed by the Concessionaire until necessary. Once connections or entrances have been disturbed, they shall be maintained and completed as follows:
 - 1. Connections that had an original paved surface shall be brought to a grade that will smoothly and safely accommodate vehicular traffic through the intersection, using pavement. Connections that had an original unpaved surface shall be brought to a grade that will smoothly and safely accommodate vehicular traffic through the intersection, using either the required material or a temporary aggregate stabilization course that shall be placed as soon as practicable after connections are disturbed.
 - 2. Mainline connections shall have all lanes open during construction. If there are delays in prosecution of work for other connections, connections that were originally paved shall have at least two lanes maintained with a temporary paved surface. Those that were not originally paved shall be maintained with a temporary aggregate stabilization course.
 - 3. Mainline access/egress connections shall have all lanes open during construction unless otherwise agreed with the Department. Other entrances shall be graded concurrently with the roadway with which they intersect. Once an entrance has been disturbed, it shall be completed as soon as is practicable, including placing the required base and surface course or stabilization. If the entrance must be constructed in stages, such as when there is a substantial change in the elevation of the roadway with which it intersects, the surface shall be covered with a temporary aggregate stabilization course or other suitable salvaged material until the entrance can be completed and the required base and surface or stabilization course can be placed.
- Q. When the Concessionaire elects to complete the rough grading operations for the entire Opitz Project or exceed the length of one full day's surfacing operations, the rough grade shall be machined to a uniform slope from the top edge of the existing pavement to the ditch line.

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- R. When the surface is to be widened on both sides of the existing pavement, construction operations involving grading or paving shall not be conducted simultaneously directly opposite each other and the surface of pavement shall be kept free from soil and other materials that might be hazardous to traffic. Prior to opening of new pavement to traffic, shoulders shall be roughly dressed for a distance of three feet from the edge of the paved surface.
- S. Where the Concessionaire places obstructions such as suction or discharge pipes, pump hoses, steel plates or any other obstruction that must be crossed by vehicular traffic, they shall be bridged in accordance with plans submitted by the Concessionaire and approved by the Department. Traffic shall be protected by the display of warning devices both day and night. If operations or obstructions placed by the Concessionaire damage an existing traveled roadway, the Concessionaire shall cease operations and repair damages.
- T. Where existing hydraulic cement concrete pavement is to be patched, the operation of breaking and excavating old pavement shall extend for a distance of not more than two miles. Patching shall be coordinated with excavating so that an area of not more than one-half mile in which excavated patches are located shall be left at the end of any day's work. Necessary precautions shall be taken to protect traffic during patching operations.
- U. The Concessionaire shall construct, maintain, and remove temporary structures and approaches necessary for use by traffic. After new structures have been opened to traffic, temporary structures and approaches shall be removed. The proposed design of temporary structures shall be submitted to the Department for its approval together with other associated Design Documentation.
- V. If the Concessionaire fails to remedy unsatisfactory maintenance not complying with these Technical Requirements within a mutually agreed upon time after receipt of a written notice by the Department, the Department may proceed with adequate forces, equipment, and material to maintain the Opitz Project. Any compensation will be in accordance with the Agreement. The Concessionaire shall have the right to dispute the Department's determination that maintenance is unsatisfactory.
- W. All temporary traffic controls shall be shown on Approved For Construction (AFC) Plans.
- X. Only TL-3, Type I Re-Directive Impact Attenuators shall be used on interstates, limited access highways, major arterials, and its associated ramps unless otherwise approved by the Department in its sole discretion. TL-3, Type II Non-Redirective Impact Attenuators may only be used with movable barrier.

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- Y. All stages and phases of construction, including installation and testing of the Electronic Toll and Traffic Management (ETTM) system, shall be covered by a approved TTC plan.
- Z. If any sidewalk or shared use path is requested to be closed, the alternative routes considered shall be covered by a TTC plan and/or detour plan and approved by the Department.

1.9.3 Transportation Management Plan

- A. The Concessionaire shall prepare a Transportation Management Plan (the “Opitz Project TMP”) in accordance with VDOT IIM-LD-241/TE-351 for all proposed Work associated with the Opitz Project. The Opitz Project TMP shall document how traffic shall be managed during the construction of the Opitz Project. The Opitz Project is classified as a Type C, Category V in terms of the TMP requirements of IIM-LD-241/TE-351.
- B. The Concessionaire shall coordinate all Work in accordance with the Opitz Project TMP. The Concessionaire’s sequence of construction shall seek to both expedite construction while lessening the effect of such construction on the traveling public.
- C. The Opitz Project TMP shall:
 - 1. include TTC plans detailing all phases of Work, proposed lane closures, temporary traffic controls through the work area, and all construction accesses for approval by the Department;
 - 2. address safe and efficient operation of adjacent public transportation facilities and State Highways;
 - 3. include coordination with local agencies and other contractors performing work in the vicinity of I-95;
 - 4. reflect the noted Scope of Work and all applicable Technical Requirements; and
 - 5. accommodate safe and efficient snow removal operations and ensure proper drainage during all phases of construction.
- D. All users must be addressed and accommodated, including pedestrians, bicyclists, transit vehicles, and other motorists. Access must be maintained to all businesses, residential communities, Emergency crossovers and private entrances at all times.
- E. If additional traffic counts are required, it will be the responsibility of the Concessionaire to collect such data. The Concessionaire shall note that any proposed detour utilizing local neighborhood streets will require coordination

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with the applicable locality, as appropriate, and are subject to the terms and conditions of the Department's approval.

- F. Construction signs and pavement markings (temporary) shall be installed, maintained, adjusted, and removed by the Concessionaire throughout the duration of the Opitz Project. These items shall be shown on and coordinated with the Sign Sequencing Plan defined in Section 3.9.3 of these Technical Requirements. If the Concessionaire chooses to remove any existing pavement markings from any roadway to install temporary markings to facilitate his work, the Concessionaire shall resurface the roadway in accordance with Section 3.8 of these Technical Requirements.
- G. All entrances, intersections or pedestrian access points/routes that will be affected by the work zone or by the temporary traffic control devices shall be maintained or an acceptable alternate must be provided by the Concessionaire.
- H. Temporary barriers shall be shown in the TTC plans and shall be in accordance with the applicable standards and specifications set forth in Attachment 1.5a. If Traffic Barrier Service Concrete is warranted based on the criteria for determining the application of barrier per the Virginia Work Area Protection Manual and a completed Engineering and Traffic Investigation-Work Zone Channelization/Barrier Analysis, the guidelines provided in the Roadway Design Manual and IIM-LD-93 shall be utilized.

1.10 Quality

1.10.1 General Requirements

- A. The Concessionaire shall develop, implement, and maintain a quality management system that includes a Quality Management System Plan (QMSP) that meets the applicable Standards and Specifications set forth in Attachment 1.5a, including the VDOT *Minimum Requirements for Quality Assurance & Quality Control on Design-Build & Public-Private Transportation Act Projects (July 2018)* (VDOT QA/QC Guide) as described in Attachment 1.3. Where appropriate, the QMSP shall also incorporate requirements from VDOT Manual of Instructions for Materials Division, applicable design manuals, Construction Manual, Instructional Informational Memoranda, Maintenance Manual, Survey Manual, Right of Way Manual, Utility Relocation Manual, and Inspection Manual, as well as the Road and Bridge Specifications, Road and Bridge Standards, MUTCD, and Virginia Work Area Protection Manual.
- B. The Concessionaire, the Opitz Construction Contractor, subcontractors, suppliers and consultants shall adhere to the QMSP.
- C. Neither the Opitz Construction Contractor nor any of its subcontractors, suppliers or consultants, shall be delegated quality management responsibility in any manner such that the Concessionaire is relieved of any responsibility or

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liability for the performance of those entities. At all times, contractual and otherwise, and by all means, the Concessionaire shall be contractually responsible for the quality compliance of the Project no matter the provider of services or supplier of material.

- D. The Concessionaire shall review and report its compliance with all PDPs, in accordance with Section 1.3, as part of its quality management system.
- E. The Opitz Construction Contractor and its subcontractors, suppliers, or consultants shall ensure that their quality records are available to enable the Department to monitor and establish whether the Concessionaire's obligations under the Agreement are met.

1.10.2 Design Quality Management

- A. The Concessionaire is responsible for design quality in accordance with the VDOT QA/QC Guide. The Concessionaire shall be responsible for establishing and overseeing a QA/QC program for all pertinent disciplines involved in the design of the Opitz Project, including review of design, working plans, shop drawings, specifications, and constructability of the Opitz Project. The Concessionaire shall be responsible for all of the design, inclusive of QA and QC activities. Members of the Design QA and QC team are responsible for review of all design elements to ensure the development of the plans and specifications are in accordance with the requirements of the Agreement. Design QA should be performed by one or more member(s) of the lead design team that are independent of the Design QC.
- B. The Design Quality Management Plan (DQMP), as described in Attachment 1.3, will provide the Department assurance that the design plans and submittals will meet all requirements of the Agreement. The Concessionaire or its designees shall be responsible for all quality assurance and quality control activities required to manage its own processes as well as those of its contractors, subcontractors, and suppliers of any tier.

1.10.3 Construction Quality Management

- A. The Concessionaire shall develop, execute, and maintain a Construction Quality Management Plan (CQMP) for the full duration of the Agreement in accordance with Attachment 1.3. The Concessionaire shall have the overall responsibility for both the QA and QC activities and shall be responsible for all QA activities and QA sampling and testing for all materials used and Work performed on the Opitz Project. These QA functions shall be performed by an independent firm that has no involvement in the construction and QC program and activities. There shall be a clear separation between QA and construction, including separation between QA inspection and testing operations and construction QC inspection and testing operations, including testing laboratories. Two independent, AASHTO Material Reference Laboratory-

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certified testing laboratories will be required, one for QA testing and one for QC testing.

- B. The QAM shall have the responsibility to enforce the Opitz Construction Contract requirements when deficient materials or unsatisfactory finished products fail to conform to the requirements of the Opitz Construction Contract. The QAM, in accordance with his or her assignment, shall be responsible to observe the construction in progress and to ensure the QA/QC testing and inspection is being performed in accordance with the requirements of the Opitz Construction Contract.
- C. The Concessionaire shall establish and maintain a Quality Assurance Auditing and Non-Conformance Recovery Plan (AR Plan) for uniform reporting, controlling, correction and disposition, and resolution of non-conformance (including disputed non-conforming items) issues that may arise on the Opitz Project. The Concessionaire's AR Plan shall establish a process for review and disposition of non-conforming workmanship, material, equipment, or other construction and design elements of the Work, including the submittal of the design review process for field changes. All deficiencies (hereinafter referred to as a non-conformance), including those pertaining to rules, regulations, and permit requirements, shall be documented by the QAM. A NCR referenced by a unique number shall be forwarded to the Department within seven (7) days of discovery of the non-conformance. Non-conformance procedures are provided in the QA/QC Guide.
- D. The Concessionaire shall also be responsible for providing QA/QC testing for all materials manufactured off-site.
- E. The Concessionaire may use the Department's resources for the following construction quality control activities where the Department routinely provides these services:
 - 1. Off-site programmatic inspection, including supplier plant acceptance inspections;
 - 2. Off-site programmatic testing, including supplier plant acceptance testing; and
 - 3. Items on the VDOT's pre-approved list.
- F. Any inspections by the Department representatives shall not relieve the Concessionaire of any obligation to furnish acceptable materials, provide acceptable designs, and complete construction in accordance with the Agreement.

1.10.4 Materials Supply and Quality Requirements

- A. Unless otherwise specified in the Technical Requirements or subject to mutual agreement, materials, equipment, and components that are to be incorporated into the finished Work shall be new. As part of the Construction Documentation, the Concessionaire shall submit statements of the known origin, composition, and manufacture of all materials to be used in the Work, including optional or alternate items, using VDOT's Form C-25.
- B. All materials or equipment (excluding the equipment maintained and operated by the Opitz Construction Contractor) physically installed, which will become part of the completed Work, whether it is permanent or temporary, must conform to the requirements of the Agreement, and shall be furnished with valid test data required to document the quality of the material or equipment at least two (2) weeks prior to delivery. The Concessionaire shall change the source of supply and furnish material or equipment from other approved sources, if the requirements are not met, and shall notify the Department of this change, and provide the same identifying information noted in this section, at least two (2) weeks prior to delivery. Materials shall not contain Hazardous Waste or be furnished from a source containing toxic, hazardous or regulated solid wastes.

1.10.5 Inspection of Work

- A. The Concessionaire is responsible for continuous quality control and quality assurance in accordance with the QMSP. All stages, materials, and details of the Work, including machines and plant equipment used in processing or placing materials, are subject to independent inspection by the Department in accordance with the Agreement.
- B. If materials are used or Work is performed without following the QMSP or relevant procedures, the Concessionaire may be required to remove and replace non-conforming Work or material at no additional cost to the Department. The Concessionaire shall abide by the QMSP in terms of correcting defective, deficient, or non-conforming Work. Any such defective, deficient, or non-conforming Work that is not completely replaced or otherwise remains in place, must be accepted by the Department prior to the addition of any new Work being constructed on or adjacent to the defective, deficient, or non-conforming Work, unless otherwise mutually agreed by all parties. Approval or disapproval of non-conforming Work shall be given by the Department within fourteen (14) days of submittal to the Department, or as otherwise mutually agreed. Any basis for disapproval must be submitted to the Concessionaire in writing by the Department. At the sole discretion of the Department, the Department may allow the Concessionaire to provide the Department with a credit to the Opitz contract value for the Department's acceptance of such non-conforming Work.

- C. If an inspection reveals that Work has not been properly performed, the Concessionaire shall promptly inform the Department of the schedule for correcting such Work and the time when an inspection of the corrected Work can be made.

1.10.6 Removal of Unacceptable or Unauthorized Work

- A. No Work shall be done until the Concessionaire establishes the applicable right of way, lines and grades. Work that is done beyond the lines shown on the AFC plans, unless otherwise agreed, will be considered unauthorized. Such Work shall be subject to review by the Department and may be ordered removed or replaced.
- B. Any Work that does not conform to the Technical Requirements will be considered unacceptable and must be promptly identified by the responsible party, as identified in the QMSP. Unacceptable work shall be remedied or removed immediately unless otherwise agreed by the Department, and replaced in manner acceptable to the Department.
- C. If the Concessionaire fails to comply promptly with any order of the Department or the QAM made under the provisions of the QMSP, the Department or the QAM will have the authority to cause unacceptable or unauthorized Work to be remedied or removed and replaced. If the Concessionaire fails to exercise the appropriate management of the Work with regards to the remedy of defective, deficient, or non-conforming Work, or the prevention of such defective, deficient, or non-conforming Work from re-occurring, the Department shall have the right to stop or suspend the affected Work until such time the defective, deficient, or non-conforming Work is remedied.

1.11 Not Used

1.12 Third Parties and Permitting

1.12.1 Permitting

- A. The Concessionaire shall obtain permits, approvals, and coordinate with any relevant Governmental Authorities and other entities necessary to complete the Opitz Project, with assistance from the Department as reasonably requested. All Governmental Approvals applicable to construction Work will be the responsibility of the Concessionaire, with the exception of those Governmental Approvals for which the Department is responsible per the Agreement. The Concessionaire shall provide copies of all permits and permit modifications to the Department upon receipt.
- B. The Concessionaire shall obtain any required waiver or variance from each applicable local government regarding a local noise ordinance, as needed to prosecute the Work. The Department will make reasonable efforts to assist the

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Concessionaire in obtaining any such waiver or variance. The Concessionaire shall adhere to the requirements of the noise waiver in planning and performing any construction. If the local government identifies a violation all costs associated with any delays or corrective action is the responsibility of the Concessionaire.

- C. The Concessionaire will be responsible for all costs associated with compliance with any ordinance and Law or any violations of Law attributed to the activities of the Concessionaire in accordance with the Agreement.

1.12.2 Third Parties

- A. If any portion of the Opitz Project is located within the limits of a municipality or locality, military installation, or other federally owned property, the Concessionaire shall cooperate with the appropriate officials and agents in the prosecution of the Work to the same extent as with the Department.
- B. The Concessionaire shall coordinate its activities with municipalities and localities, and other contractors working in the area. As provided in the Agreement, the Concessionaire's work program and schedule shall consider and coordinate with the work of other contractors involved with adjacent work, including maintenance, in the corridor.
- C. If other separate contracts are awarded by the Department or by other Governmental Authorities, including projects under the PPTA, that affect the Concessionaire's work, including work related to abutting roadways and connectors and work associated with a TAMS contract, the Concessionaire will coordinate its work with the work being performed by the other contractors. The Department will contractually require its separate contractors to cooperate with, and coordinate their activities with, the Concessionaire.
- D. The Concessionaire shall be responsible for contacting other contractors regarding their anticipated schedules to complete the associated projects or key milestones of the associated projects they are/will be working on. See Section 1.14 of these Technical Requirements.
- E. The Concessionaire shall not impede the access or progress of such work by other contractors, but shall cooperate and coordinate with other contractors for the timely completion of all construction activities. This shall include attendance at coordination meetings deemed necessary or advantageous by the Department or its contractors.

1.12.3 Fire Hydrants

- A. No Work shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire authority.

- B. When the Concessionaire's Work requires the disconnection of "in service" fire hydrants, the Concessionaire shall notify the locality's fire department or communications center at least 24 hours prior to disconnection. In addition, the Concessionaire shall notify the locality's fire department or communications center no later than 24 hours after reconnection of such hydrants.

1.12.4 Not Used

1.12.5 Not Used

1.12.6 Not Used

1.13 Emergency Services

1.13.1 Liaison

The Concessionaire shall comply with the Department requirements for participation in industry and statutory initiatives regarding Emergency management, where applicable.

1.13.2 Emergencies and Extraordinary Circumstances

- A. Subject to the Agreement, the Concessionaire's response to Emergencies and extraordinary circumstances as part of the Opitz Project will be in accordance with the Agreement and not inconsistent with the Department's Emergency evacuation plan and shall ensure that:
 - 1. safety of motorists, pedestrians and workforce personnel shall be the primary objective for all decisions and actions;
 - 2. clearance of a travel lane for Emergency response vehicles shall be by the most expedient route whether GP Lanes or HOT Lanes (in such circumstances, the decision of the Department or the Emergency services in charge shall govern);
 - 3. military vehicles acting in an Emergency response capacity or in defense of the sovereign homeland of the United States of America shall be given free and unrestricted access to the HOT Lanes;
 - 4. if the U.S. Secret Service (USSS), in coordination with the Virginia State Police (VSP), determines movements of the President of the United States require use of the HOT Lanes, the Concessionaire shall cooperate and comply fully with USSS and VSP instructions with respect to Work activities, lane closures and traffic management;
 - 5. the Department reserves the right, by direction of the Fredericksburg and Northern Virginia District Administrators or the NRO Director, to assume and exercise control of the HOT Lanes in part and/or in

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their entirety, including all applicable systems and field devices via available interfaces, pursuant to the Agreement; and

6. the Concessionaire will, as needed, participate in Emergency exercises conducted by Governmental Authorities.
- B. During special events that have significant impact on traffic flow, the Concessionaire shall designate a responsible party in charge to work with the Department's NRO Special Events and Incident Management Coordinator to develop traffic management plans for the event.
- C. Should the Concessionaire fail to respond to an Emergency or extraordinary circumstance in a timely manner in accordance with the requirements of the Agreement, the Department shall have the right to take necessary and appropriate action to handle such Emergency or extraordinary circumstance.

1.14 Safety

1.14.1 General Requirements

- A. The Department and the Concessionaire recognize that in every circumstance, activity, and decision related to the Opitz Project, safety of the public, Concessionaire personnel, and Department personnel is the primary concern. Ensuring and maintaining safety on the Opitz Project shall supersede any and all other objectives.
- B. The Concessionaire shall designate a full-time Opitz Project safety officer for the Construction Period. The Opitz Project safety officer will ensure that designated Opitz Project personnel can be contacted by the Department and Emergency services personnel at all times. The safety officer shall have the necessary expertise and experience required to ensure compliance with applicable laws and the Opitz project safety requirements.

1.14.2 Construction Safety and Health Standards

- A. Compliance with construction safety and health standards is a condition of the Agreement, and shall be made a condition of each subcontract entered into pursuant to the Agreement. The Concessionaire and any Contractor shall not require any worker employed in performance of the Agreement to work in surroundings or under working conditions that are unsanitary, hazardous, or dangerous to their health or safety, as determined under construction safety and health standards promulgated by the U.S. Secretary of Labor in accordance with the requirements of Section 107 of the Contract Work Hours and Safety Standards Act.
- B. The Concessionaire shall comply with the Virginia Occupational Safety and Health Standards adopted under the Code of Virginia and the duties imposed under the Code. Any violation of the requirements or duties that is brought to

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the attention of the Concessionaire by the Department or any other person shall be immediately abated.

- C. Pursuant to the above, the Concessionaire shall comply with the safety requirements as listed below, and as outlined in the Health, Safety and Security Plan as prepared under the Agreement and Attachment 1.3. The Concessionaire shall ensure that proper safety training that satisfies all Law and the Health, Safety and Security Plan is provided to all relevant personnel before such personnel are permitted access to the Opitz Project or Opitz Project site.
1. The Concessionaire shall ensure that all required safety training is properly conducted in a timely manner.
 2. Specialized training (e.g., work zone safety, confined space, erosion and sediment control, energized lines, etc.) shall be provided to all relevant personnel if such training is required.
 3. Hard hats and appropriate safety footwear (steel or composite toe) as per OSHA 1926.100 and ASTM F 2413 (Specification for Performance Requirements for Protective Footwear) shall be worn while participating in or observing all types of field Work when outside of a building or outside the cab of a vehicle, and exposed to, participating in or supervising construction.
 4. Respiratory protective equipment shall be worn whenever an individual is exposed to any item listed in the OSHA standards as needing such protection unless it is shown that the employee is protected by engineering controls.
 5. Adequate eye protection (safety glasses as per ANSI/ISEA Z87.1-2010 (Z87+) - Standard for Occupational and Educational Eye and Face Protection Devices) shall be worn in the proximity of grinding, breaking of rock and/or concrete, while using brush chippers, striking metal against metal or when working in situations where the eyesight may be in jeopardy.
 6. A Class 3 high visibility shirt, vest or jacket as per ANSI/ISEA 107-2004 (Standard for High-Visibility Safety Apparel and Headwear) shall be required at all times when on or near any roadway, whether or not protected by a concrete or steel barrier. In addition, Class 3 pants are required whenever not protected by a concrete or steel barrier. Note: This must be worn over any other clothing such as rain coats.
 7. Standards and guidelines of the current Virginia Work Area Protection Manual shall be used when setting, reviewing, maintaining, and removing temporary traffic controls.

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8. Flaggers shall be certified in accordance with the Virginia Flagger Certification Program.
9. No person shall be permitted to position themselves under any raised load or between hinge points of equipment without first taking steps to support the load by the placing of safety bar or blocking.
10. Explosives shall be purchased, transported, stored, used and disposed of by a Virginia State Certified Blaster in possession of a current criminal history record check and a commercial driver's license with hazardous materials endorsement and a valid medical examiner's certificate. All Federal, State and local regulations pertaining to explosives shall be strictly followed.
11. All electrical tools shall be adequately grounded or double insulated. Ground Fault Circuit Interrupter (GFCI) protection must be installed in accordance with the National Electrical Code (NEC) and current Virginia Occupational Safety and Health agency (VOSH). If extension cords are used, they shall be free of defects and designed for their environment and intended use.
12. No person shall enter a confined space without training, permits, and authorization.
13. Fall protection shall be required whenever an employee is exposed to a fall six feet or greater.
14. Hearing protection as per ANSI/ISEA S12.68-2007 for hearing protection must be carried at all times and must be worn when working near areas where excessive noise is being generated.
15. When working near hot areas, such as road asphaltting, long sleeve cotton shirts and pants must be worn whether night or day.
16. All damaged or worn PPE must be replaced immediately. No person may undertake any task using or wearing faulty PPE.

D. Safety Reporting

1. The Concessionaire shall submit, on a monthly basis, a Safety Statistics Report that shall, at a minimum, include the following information:
 - Number and Rate of First Aid Cases;
 - Number and Rate of Recordable Cases;
 - Number and Rate of Lost Work Day Cases;

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- Number of Days Away from Work;
- Number of Field Work Hours;
- Number of Near-Miss Incidents;
- Number of Utility Hits;
- Number of Investigation Reports;
- Number of Property Damage Claims; and
- Number of Field Personnel.

This information shall be provided for Direct Hire, Subcontract, and Total Labor on the Project. Information shall be provided for Current Month, Year-to-Date, and Project-to-Date.

2. For any First Aid, Near Miss, Injury, Illness, or Property Damage Incident involving the Concessionaire (including subcontractors, consultants and suppliers), within 24-hours of the incident, the Concessionaire shall provide a detailed Report of Incident that shall include time and date, brief description, classification type, location of injury. Within one week of the incident, the Concessionaire shall provide any update of the 24-hour report and an analysis of the root cause of the incident.
3. The Concessionaire shall submit, on a monthly basis, a Safety Corrective Actions Register showing all actions for the month (not just from incident sources, i.e. audits and inspections), their corrective action type (e.g. elimination, administration, isolation, engineering) and their status (open or closed).

1.15 Adjacent Project Coordination

1.15.1 General

- A. The timing of the Opitz Project will overlap with other Department projects, including the I-95 Southbound Auxiliary Lane Project in Prince William County. The Concessionaire shall coordinate and interface with the respective project team, including the Department and its associated consultants and contractors throughout the duration of the project to ensure that the respective projects are safely and properly coordinated and scheduled.
- B. In addition to the Department projects listed above, the Department may conduct yearly structural and bridge inspection/maintenance and paving maintenance that may include work on Opitz Boulevard and I-95. The Concessionaire shall cooperate with these projects during the March to

November paving season. In all cases, the existing projects that have been awarded for construction and any emergency maintenance projects and their respective contractors shall have priority in scheduling activities.

- C. The timing and scope of the Opitz Project will overlap with the Neabsco-Potomac Commuter Parking Garage Project by Prince William County. The Concessionaire shall coordinate and interface with the respective project team, including the County and its associated consultants and contractors throughout the duration of the Opitz Project to ensure that the respective projects are safely and properly coordinated and scheduled.

2 Public Information and Communications

2.1 Public Information

2.1.1 General Requirements

The Concessionaire in collaboration with the Department shall develop the required process and procedures for media relations and public information in the form of a Communications, Consultation, Public Outreach, and Community Engagement Plan (“Communications Plan”), which will be consistent with the Agreement and the requirements included in Attachment 1.3. These processes and procedures will acknowledge that there are differing responsibilities for both parties during the Work period and throughout the Operating Period.

2.1.2 Interface and Liaison with the Department

- A. Management protocols shall be developed between the Concessionaire’s Opitz Project communications team and the Department’s Representative. These protocols shall detail:
 - 1. a regime of regular reporting to the Department on communications activities, current and outstanding community issues, and recent media activity;
 - 2. media protocols, providing clarity of responsibility in relation to media comment on particular aspects of the Opitz Project;
 - 3. stakeholder relations protocols, assigning responsibility for briefing and information to stakeholders on Opitz Project progress and milestones;
 - 4. requirements in relation to Department’s review and comment on Opitz Project marketing, communications, and public outreach material; and
 - 5. processes for managing communications surrounding emergency management and recovery operations.

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- B. Meetings and public interface required by federal and state law will be conducted in accordance with the current version of the Department's *Policy Manual for Public Participation in Transportation Projects*. The Concessionaire will conduct additional meetings, public interface and marketing activities in accordance with the Communications Plan.
- C. The Concessionaire shall collaborate with the Department in the development of all communications and marketing strategies to ensure they are consistent with both parties' values, needs, and goals. The Concessionaire shall provide the Department with advance copies of project- communications materials for review and comment prior to dissemination. The Department will provide any comments in a timely fashion.
- D. The Department reserves the right to review and comment on any public communications, including publicity and branding.

2.1.3 Project Communications Team

- A. The Concessionaire shall establish a Opitz Project communications team through which all communication and public outreach activities on the Opitz Project on behalf of the Concessionaire will be coordinated.
- B. The Opitz Project communications team will include:
 - 1. a public affairs manager and adequate support staff and/or consultants, who shall have responsibility for coordinating delivery of the Public Information and Communications Plan. The public affairs manager will manage the relationship with the Department's communication team and reporting on all communications and outreach activities;
- C. The Opitz Project communications team to develop and agree upon team protocols for communication between team members, incorporating measures related to notification and approval timeframes, media interface, and preparation of Opitz Project communication materials.

2.1.4 Public Information and Involvement

- A. The Concessionaire's and the Department's communications team shall maintain an open dialogue with the stakeholders and communities immediately surrounding the Opitz Project with the objective of building a long-term relationship based on trust and respect. The Concessionaire will work with the communities to identify specific concerns and strategies for mitigation.

2.1.5 Pre-Operating Period and Operating Period – Public Engagement and Awareness

- A. No less than 90 days prior to Service Commencement the Concessionaire shall take measures to inform users to ensure that the motorists are educated about

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the features and benefits of the Opitz Project, so that they can make an informed choice about their use of the HOT Lanes once open to traffic.

- B. The Concessionaire shall develop a public engagement and awareness program to fit within the context of the broader Communications Plan for the Opitz Project. It shall address but will not be limited to:
1. education about dynamic pricing, if used;
 2. information on requirements for using HOT Lanes, including HOV eligibility and transponder requirements;
 3. plans for the opening of the Opitz Project to traffic and communications that will facilitate smooth ongoing operations;
 4. interface with E-ZPass marketing and communications, to facilitate distribution of transponders to motorists who intend to use the HOT Lanes;
 5. education about driver information systems in use on the HOT Lanes, so motorists understand on-road sources of information that will facilitate choice and lane control signals (LCS) of the lane use management system (LUMS), if applicable;
 6. provision of information to motorists and stakeholders to facilitate the MOT during ongoing maintenance activities. This shall include:
 - i. packaging of all MOT information, such as anticipated delays and lane closures, for provision to the Opitz Project communications team and to the Department's communication team on a regular basis, to facilitate communication with the media, stakeholders, and the broader community; and
 - ii. communication with property owners in direct impact areas.
 7. The Concessionaire and the Department will coordinate closely in outreach and communications to elected officials related to the Opitz Project. The Opitz Project communications team will work with project management to develop and agree upon a protocol to ensure consistent and effective communications to elected officials directly related to the Opitz Project. Both the Department and the Concessionaire will have ongoing dialogues with the elected officials and other key stakeholders.
 8. coordination with local agencies; and
 9. notification program to inform motorists and the broader community about expected traffic changes/delays

2.2 Media Relations

2.2.1 Media Outreach

- A. While there will be some overlap between the Parties on some communications and outreach activities during the Work period and Operating Period, The Department will serve as the sole source to the news media and community stakeholders on specific lane closures, delays, detours, and other construction-related impacts associated with the Opitz Project. The Opitz Project communications team will put processes in place to ensure close coordination with the Department on media outreach activities, issues, and responses, and will promote consistency with the Communications Plan.
- B. The Concessionaire shall:
1. develop and provide a set of media protocols upon which the Department and Concessionaire will agree to govern responsibilities and reporting in relation to contact with the media, including guidelines for information sharing, policies to promote consistent messages, and procedures specific to managing emergencies and incidents.
 2. provide timely response to media inquiries and keep the Department informed of media inquiries regarding the Opitz Project and the nature of responses that are documented as mutually agreed;
 3. provide relevant Opitz Project information to the media in a timely fashion;
 4. monitor all media coverage of the Opitz Project; and
 5. provide copies of all press releases or other media materials to the Department in advance of distribution.

2.3 Project Marketing

2.3.1 Project Branding

All public communications on the Opitz Project will be undertaken within the framework of a uniform project 'brand' to ensure consistency of the marketing and communications across all project phases. The branding will be developed by the Concessionaire and is subject to the Department's review and comment.

2.4 Communities and Public Outreach

2.4.1 Integrated Communications, Consultation, Public Outreach, and Community Engagement Plan

- A. The Concessionaire shall deliver an integrated Communications Plan that:
1. provides an effective framework for communication between the Concessionaire and stakeholders;
 2. effectively engages the community in the design, construction, and operation of the Opitz Project to minimize negative impacts and maximize positive outcomes;
 3. builds a strong and enduring relationship with stakeholders and the community within the toll facilities catchments over the life of the Opitz Project;
 4. identifies and manages risks associated with the Opitz Project;
 5. develops a strong and enduring brand relationship between the community, toll facility drivers, and the owners and operators of the Opitz Project;
 6. maximizes public awareness of the features and benefits of the HOT Lanes; and
 7. ensures the public understands how best to use the HOT Lanes and the requirements for travel on the system, including congestion pricing and paying tolls, obtaining and using transponders, and user eligibility requirements.
- B. The Communications Plan, consistent with the Department's goals for the Opitz Project, will be presented to the Department for review and comment and will form the basis for all communication activities during the design and construction of the Opitz Project, as well as during the Work pre-operational and Operating Periods.
- C. The plan shall provide a detailed outline of communication tools and strategies to be employed during each phase of the Opitz Project development, delivery, and operation, including the matters outlined in the sections below.
- D. The plan shall contain a crisis communications plan and procedures for coordination with the Department and responsiveness to the media.

2.4.2 Stakeholder Outreach and Information

- A. The Concessionaire shall develop, deliver, and operate the Opitz Project in a manner consistent with building and maintaining effective working relationships with all stakeholders in the Opitz Project's success.

3 Design and Construction Requirements

3.1 General

- A. The Opitz Project shall be designed and constructed pursuant to the design criteria and specifications set forth in the Agreement including these Technical Requirements.
- B. The Work shall not preclude the local, state, and federal long-range transportation planning improvements.
- C. All Design Documentation and Construction Documentation shall comply with the requirements of applicable Governmental Authorities.
- D. Where the Work to be performed does not meet minimum American Association of State Highway and Transportation Officials (AASHTO) standards and specifications, the Concessionaire shall submit to the Department a design exception, pursuant to the Department's Instructional and Informational Memorandum on design exceptions, (using LD-440 format) for Department and FHWA approval.
- E. Where the Work to be performed meets or exceeds minimum AASHTO design criteria, but does not meet the Department's minimum standards and specifications, the Concessionaire shall submit to the Department a design waiver (using LD-448 format) for Department approval.
- F. The Concessionaire is responsible for design and construction of any mitigation measures identified in design exceptions and design waivers.
- G. The Concessionaire is solely responsible for acquiring design exceptions and design waivers. The Department's approval of a Concessionaire request for a design exception does not guarantee FHWA approval. Previously submitted design exceptions and design waivers are subject to reevaluation if additional information becomes available that was not known at the time of initial submittal or conditions change that were used in the analysis of the original design exception or design waiver and, in either case, if such additional information or changed conditions materially affect the premise on which the original design exception or design waiver at issue was based.
- H. The Concessionaire shall take all reasonable efforts to ensure that the condition of existing buildings, structures, roadways, sidewalks, paths, trails, signs, lighting, TTMS and signal equipment, or other property that is to remain is not adversely affected by the performance of the Work. Prior to commencing Work, the Concessionaire shall perform property pre-condition surveys and monitor their condition during the Work period. The Concessionaire shall repair any damage caused by the Work to at least a condition comparable to that which existed immediately prior to the damage. The Department shall be given the opportunity to witness any pre-condition surveys and/or monitoring

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and the Concessionaire shall make the results available to the Department before commencing any Work that may affect the property.

- I. Values for properties of materials to be used in the Work shall conform to the specified values or range of values in the Standard Documents and specified in the Technical Requirements. Less than complete conformity may be tolerated if obtaining exact or complete conformity would not be feasible and if authorized by the Department. If permissible tolerances are exceeded or if consistent deviations from the plans or abrupt changes in grade occur, even though within the tolerances, the Concessionaire shall ensure that the affected areas are reconstructed to conform to the specified tolerance such that the Work is fit for its intended purpose.
- J. The Opitz Project is considered part of the Strategic Highway Network (STRAHNET).
- K. All Design Documentation and Construction Documentation shall be in US Customary units.
- L. The Concessionaire shall ensure that areas impacted by the Work are subject to continual and un-interrupted removal of rubbish, scrap material, and debris. Work sites shall have a neat, safe and orderly appearance at all times. Prior to Final Completion, the Concessionaire shall remove its construction equipment, materials and debris from the Opitz Project Right of Way and other property used by or adjacent to the Opitz Project.
- M. When removal of mailboxes and newspaper boxes is made necessary by construction operations, the Concessionaire shall place them in temporary locations so that access to the boxes will not be impaired. Prior to Final Completion, boxes shall be placed in their permanent locations as agreed with the Department, upgraded to current criteria, and left in as good condition as when found.
- N. The Concessionaire shall take all reasonable efforts to preserve property and improvements along the boundary lines of and adjacent to the Work unless the removal or destruction is absolutely required and consistent with the Construction Documentation. The Concessionaire shall use suitable precautions to prevent damage to such property. If property is damaged, the Concessionaire shall restore property to a condition similar or equal to that existing before such damage was done by repairing, rebuilding, or restoring, or making settlement with the property owner. Where property of third parties has been damaged and repaired by the Concessionaire, the Concessionaire shall secure from the owner a release from any claim against the Department. A copy of this release shall be furnished to the Department.
- O. The Concessionaire shall provide certified letters to the property owners at the address on record that comply with the Code of Virginia §33.2-1011, Right of Entry. Copies of the letters, signed return receipt or proof of delivery shall be

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provided to the Department fifteen days after the proof of delivery. Notice of intent to enter shall be deemed made on the earlier of the date of mailing, if mailed, or on the date delivered.

3.2 Not Used

3.3 Environmental

3.3.1 Environmental Documentation

- A. The Concessionaire will comply with the environmental commitments set forth in the approved NEPA Document(s) as defined in the Agreement.
- B. The Concessionaire will ensure that the environmental commitments and all conditions of regulatory approvals made in the approved NEPA Document(s), including the documentation referenced in Table 3.3 are implemented at the appropriate phase of the Opitz Project development. The Concessionaire will provide documentation to the Department as each environmental commitment and/or condition of a Regulatory Approval is implemented.

Table 3.3 NEPA Documentation for the Opitz Project	
Document	Date
Categorical Exclusion (CE) and Attachments	January 2022
Right of Way Re-evaluation (EQ-201) review (Opitz Project)	To be completed by the Concessionaire
Environmental Certification (EQ-103) review (Opitz Project)	To be completed by the Concessionaire
Plans, Specification and Estimate (PS&E) Re-evaluation (EQ-200) review (Opitz Project)	To be completed by the Concessionaire

- C. If the Concessionaire becomes aware of new information that may have a bearing on environmental impacts or the Concessionaire proposes changes to the Opitz Project design and/or footprint, it shall notify the Department who will then determine the need for a re-evaluation of the NEPA approvals. The Concessionaire shall be responsible for preparation of any information required for the re-evaluation of the NEPA approvals. The Concessionaire will perform any right of way re-evaluation reviews needed to determine that the Right of Way to be acquired is in compliance with the NEPA approvals.
- D. Prior to right of way authorization for total and partial takes, the Concessionaire shall provide the Department with the right of way plans (approved as per the Agreement) and the Re-evaluation for Right of Way Authorization (EQ-201). The Concessionaire will perform the right of way re-evaluation review to determine the Right of Way to be acquired is in

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compliance with the NEPA approvals. For all acquisitions of Opitz Project Right of Way, if the Department or FHWA determine that the plans are not consistent with the NEPA approvals, the Concessionaire shall revise the plans until they are consistent; or the Concessionaire shall provide necessary studies and other information needed to support the Department's completion and re-evaluation of the NEPA documentation for FHWA approval at the expense of the Concessionaire. The Department will provide copies of all right of way re-evaluation reviews to the FHWA.

- E. Prior to approval of the AFC Documents, the Concessionaire shall provide the Department with final construction plans. The Concessionaire shall update and finalize the Document Re-evaluation for PS&E Authorization (EQ-200), and update and finalize the Environmental Certification/Commitments Checklist (EQ-103) prior to the Department releasing the Project for construction. The Department shall perform the Environmental Certification review and PS&E re-evaluation review and determine if plans are consistent with the scope of the NEPA approvals and all environmental commitments. If the Department or FHWA determines that the plans are not consistent with the NEPA approvals, the Concessionaire shall revise the plans until they are consistent; or the Concessionaire shall provide necessary studies and other information needed to support the Department's completion and re-evaluation of the NEPA documentation for FHWA approval at the expense of the Concessionaire. The Department will provide copies of all Environmental Certification reviews and PS&E re-evaluation reviews to the FHWA.
- F. If the Project includes phased work, each phase will be clearly identified and provided to the Department so that the Department can update and finalize versions of the EQ-200, EQ-201 and EQ-103 documents prior to authorizing right-of-way acquisition and construction for each phase. The Concessionaire shall verify that the EQ-200, EQ-201 and EQ-103 forms have been updated and finalized prior to obtaining approval signatures for each title sheet submittal required for right-of-way acquisition and construction approval.
- G. The Concessionaire is responsible for compliance with Law for potential staging and disposal areas outside the Opitz Project limits. The Concessionaire is also responsible for obtaining a property owner agreement for potential areas outside the existing Department right-of-way (outside the Project limits).

3.3.2 Water Quality Permits

- A. The Concessionaire is responsible for any determinations, delineations, coordination, applications, mitigation, avoidance measures, acquisitions for impacts to streams and wetlands, and administration of required state and federal water quality permits and permit modifications required for construction of the Opitz Project. The Concessionaire shall be responsible for compliance with pre-construction, construction-related and post-construction

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permit conditions. Compensation, per the Agreement, for impacts to streams and wetlands mitigated by the purchase of wetland and stream credits are the responsibility of the Concessionaire. Compensation, per the Agreement, for impacts to streams and wetlands mitigated by stream restoration construction are the responsibility of the Concessionaire. Any fines or delays associated with water quality permit violations arising out of the performance of the Concessionaire's obligations under the Agreement are the responsibility of the Concessionaire.

- B. The Concessionaire is responsible for obtaining all water quality permits required to construct the Project, including utility relocations. Should the Concessionaire propose design changes acceptable to the Department, permitting requirements may also change; the Concessionaire remains responsible for obtaining any and all necessary water quality permits and permit modifications required by the regulatory agencies.
- C. The Concessionaire or its nominee will be listed as the "permittee" in all cases. These permits, and any permit modifications, will be obtained by the Concessionaire, copies provided to the Department, and verified prior to commencing construction.
- D. After receiving the Department's release of the work, the Concessionaire shall notify the Department and the regulatory permitting agencies in writing fourteen (14) days prior to beginning work in the jurisdictional areas covered by the water quality permits.
- E. The Concessionaire shall provide to the Department copies of all permits, documentation, and correspondence with regulatory agencies. Construction activities shall not impact regulated areas within the Project limits until all applicable water quality permits have been issued to the Concessionaire. The Concessionaire shall not proceed with work covered by the water quality permits until the Department releases the work in writing. The Department may release a portion or all of such work not in jurisdictional areas, but may order a suspension of the same work after its release. The Concessionaire shall not be allowed to begin work that pre-determines the work required in the jurisdictional areas until the permits are secured.
- F. At the conclusion of the Project, the Concessionaire shall notify the Department and the regulatory permitting agencies in writing of the completion of the work in the jurisdictional areas covered by the water quality permits. At the completion of the Project, the Concessionaire is required to transfer any Virginia Marine Resources Commission (VMRC) permit back to the Department.
- G. The Concessionaire shall ensure that Project schedules accommodate any Special Provisions, Time of Year Restrictions (TOYR), and the duration of permit acquisition from the regulatory agencies. The Concessionaire shall be responsible for adhering to permit conditions and Special Provisions, as

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identified in the permit authorizations including but not limited to TOYR, avoidance and minimization recommendations, restoration of temporary impact areas, and countersinking culverts.

3.3.3 Water Pollution

- A. The Concessionaire shall exercise every reasonable precaution throughout the Term to prevent pollution of rivers, streams, and impoundments. Pollutants such as chemicals, fuels, lubricants, bitumens, raw sewage, paints, sedimentation, and other harmful material shall not be discharged into or alongside rivers, streams, or impoundments or into channels leading to them.
- B. Construction discharge water shall be filtered to remove deleterious materials prior to discharge into state waters. During specified spawning seasons, discharges and construction activities in spawning areas of state waters shall be restricted so as not to disturb or inhibit aquatic species that are indigenous to the waters. Neither water nor other effluence shall be discharged onto wetlands or breeding or nesting areas of migratory waterfowl. When used extensively in wetlands, heavy equipment shall be placed on mats.
- C. Temporary construction fills and mats in wetlands and flood plains shall be constructed of approved non-erodible materials and shall be removed by the Concessionaire to natural ground upon completion of the Work in the wetlands or flood plains, unless specifically approved by the Department (in writing) to be left in place.
- D. If the Concessionaire dumps, discharges, or spills any oil or chemical that reaches or has the potential to reach a waterway, it shall immediately notify all appropriate jurisdictional state and federal agencies and shall take immediate actions to contain, remove, and properly dispose of the oil or chemical in accordance with the local, State and federal requirements.
- E. Excavation material shall be disposed of in approved areas above the mean high water mark shown on the plans in a manner that will prevent the return of solid or suspended materials to state waters. If the mark is not shown on the plans, the mean high water mark shall be considered the elevation of the top of stream banks.
- F. Constructing new bridge(s) and dismantling and removing existing bridge(s) shall be accomplished in a manner that will prevent the dumping or discharge of construction or disposable materials into rivers, streams, or impoundments in violation of Law. Construction operations in rivers, streams, or impoundments shall be restricted to those areas where channel changes are permitted and must be entered for the construction of structures. Rivers, streams, and impoundments shall be cleared of falsework, piling, debris, or other obstructions placed therein or caused by the performance of the Work.

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- G. Stabilization of the streambed and banks shall occur immediately upon completion of Work if Work is suspended for more than 15 days. The Concessionaire shall prevent stream constriction that would reduce stream flows below the minimum, as defined by the State Water Control Board, during construction operations.
- H. If it is necessary to relocate an existing stream or drainage facility temporarily to facilitate construction, the Concessionaire shall design and provide temporary channels or culverts of adequate size to carry the normal flow of the stream or drainage facility. Stabilization of the streambed and banks shall occur immediately upon completion of, or during the Work if the Work is suspended for more than 15 days.
- I. The Concessionaire shall submit a temporary relocation design to the Department for review and acceptance in sufficient time to allow for discussion and correction prior to beginning the Work the design covers. The Concessionaire shall pay costs for the temporary relocation of the stream or drainage facility shall be included in appropriate items of the Agreement. Temporary bridges or other structures shall be used wherever an appreciable number of stream crossings will be made.

3.3.4 Hazardous Substances

- A. In accordance with the Agreement, the Concessionaire shall perform any additional studies and investigations as necessary to constitute an appropriate level of due diligence and/or determine actions to ensure due care with respect to Hazardous Substances. The Concessionaire shall submit a summary of findings to the Department.
- B. The Concessionaire shall not acquire property until any required Phase I Environmental Site Assessment is complete and approved.
- C. Following the acquisition and vacation of properties and associated activities, the Concessionaire shall perform asbestos inspections of all structures (including bridge structures) and if necessary, shall perform asbestos abatement and asbestos monitoring in accordance with the Department's asbestos inspection procedures and asbestos abatement specifications. The Concessionaire shall perform abatement of asbestos-containing materials and asbestos project monitoring in accordance with all Law, as well as the applicable standards and specifications referenced in Attachment 1.5a.
- D. The Concessionaire shall be responsible for the development of a Spill Prevention, Control, and Countermeasure Plan as required by regulation and for submission of any required plan to the Department prior to start of construction. In the event of spills or releases of petroleum products and other hazardous liquids or solid materials, the Concessionaire shall take immediate action to contain and eliminate the spill release, including the deployment of environmental protection measures to prevent the migration of the spill into

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the waters of the United States and of worker exposure protection measures. The Concessionaire shall notify the Department immediately of all instances involving the spill, discharge, dumping or any other releases or discovery of hazardous materials into the environment and shall provide all required notifications and response actions.

- E. The Concessionaire shall manage solid waste, hazardous waste, and hazardous materials in accordance with all applicable federal and state environmental regulations and shall implement good housekeeping, waste minimization and pollution prevention practices.
- F. Unless a structure has been otherwise classified, the Concessionaire shall assume all coated structures are Type B.
- G. Asbestos inspection, abatement and project monitoring shall be performed by individuals and firms licensed by the Virginia Department of Professional and Occupational Regulation. Asbestos abatements shall not be performed by an asbestos contractor who has an employee/employer relationship with, or financial interest in, the laboratory utilized for asbestos sample analysis nor shall the asbestos contractor have an employee/employer relationship with, or financial interest in, the asbestos inspector and project designer working on the Project. Copies of all asbestos inspection, monitoring and disposal records shall be provided to the Department.
- H. For any asbestos waste and other non-hazardous waste, the Concessionaire shall have the signatory responsibility for the waste shipping manifest(s) and/or bill(s) of lading. For hazardous waste, the Concessionaire shall be considered the co-generator and shall be responsible for preparing the hazardous waste shipping manifest(s) for the Department's signature and as otherwise consistent with the signatory requirement under Section 411 of the Road and Bridge Specifications.
- I. The Concessionaire shall retain copies of all property studies, documents prepared for containment, management, mitigation and/or remediation, asbestos-related records and any other construction-related Hazardous Substances records in accordance with the requirements of the Agreement. A final copy of all such records shall be submitted to the Department within 30 days after Final Completion.

3.3.5 Environmental Monitoring

- A. The Concessionaire shall carry out environmental commitments during design and construction, as applicable, as identified in the CE, the final Document Re-evaluation for Right of Way Authorization (EQ-201) and PS&E Authorization (EQ-200), and the final Environmental Certification/Commitments Checklist (EQ-103). All commitment compliance shall be supported by appropriate documentation, to be provided by the Concessionaire to the Department.

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- B. The Concessionaire is responsible for the monitoring of compliance, in accordance with environmental permit requirements, with all applicable environmental laws and regulations. Should any non-compliant item(s) be identified by the Concessionaire or Department, continuous corrective action will be taken by the Concessionaire to bring the item(s) back into compliance. Notification of this circumstance shall be provided promptly by the Concessionaire to the Department.
- C. The Concessionaire shall be responsible for compliance with pre-construction and construction-related environmental commitments and permit conditions. The Concessionaire shall assume all obligations and costs incurred by complying with the terms and conditions of the permits and certifications.
- D. The Concessionaire will be responsible for, but not limited to, monitoring the Opitz Project Right of Way for nesting migratory bird species and complying with the Migratory Bird Treaty Act for recommended time of year restrictions.
- E. Except as set forth in the Agreement, the Concessionaire will be responsible for all costs, fines, penalties, and delays associated with any non-compliant items.
- F. The Department reserves the right to perform quality assurance environmental monitoring of the Opitz Project to determine whether the Concessionaire is complying with environmental commitments to Governmental Authorities and is performing activities in accordance with Law and Department specifications.

3.3.6 Environmental Stipulations

The Concessionaire hereby stipulates that any facility used in the performance of the Agreement is not listed on the EPA's List of Violating Facilities pursuant to 40 C.F.R. 15.20 (unless the Concessionaire confirms that the Opitz Project is exempt under the Clean Air Act as amended (42 U.S.C. 1857, et seq., as amended by P.L. 91-604), the Federal Water Pollution Control Act as amended (33 U.S.C. 1251 et seq. as amended by P.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 C.F.R., Part 15)) during the Term of the Agreement.

3.3.7 Not Used

3.3.8 Air Quality

- A. The Project has been assessed for potential air quality impacts and conformity with all applicable Federal and state air quality regulations and requirements. This project is located in a nonattainment area for the National Ambient Air Quality Standards (NAAQS) for 8-hour Ozone and is in attainment for all other NAAQS. The project is considered to be exempt from regional emissions analysis requirements for Ozone and all other transportation conformity requirements are not applicable. However, Virginia Department of

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Environmental Quality (VDEQ) air pollution regulations must be adhered to during the construction of this project: 9 VAC 5-130, Open Burning restrictions; and 9 Virginia Administrative Code 5-50, Article 1, Fugitive Dust precautions. The Concessionaire shall adhere to the limitations outlined in Special Provision 107E for Volatile Organic Compound Emissions Control Areas.

- B. The Concessionaire shall comply with the provisions of the Agreement, all applicable Federal requirements, the State Air Pollution Control Law and Rules of the State Air Pollution Control Board, including notifications required therein.
- C. Burning shall be performed in accordance with all applicable state and local laws and ordinances and under the constant surveillance of watchpersons. Care shall be taken so that the burning of materials does not destroy or damage property or cause excessive air pollution. The Concessionaire shall not burn rubber tires, asphalt, used crankcase oil, or other materials that produce dense smoke. Burning shall not be initiated when atmospheric conditions are such that smoke will create a hazard to the motoring public or airport operations. Provisions shall be made for flagging vehicular traffic if visibility is obstructed or impaired by smoke. At no time shall a fire be left unattended.
- D. Asphalt mixing plants shall be designed, equipped, and operated so that the amount and quality of air pollutants emitted will conform to the Rules of the State Air Pollution Control Board. Emission standards for asbestos incorporated in the EPA's National Emission Standards for Hazardous Air Pollutants apply to the demolition or renovation of any institutional, commercial, or industrial building, structure, facility, installation, or portion thereof that contains friable asbestos.

3.3.9 Noise Mitigation

- A. Noise Barriers
 - 1. As part of the approved NEPA Document(s) for the Opitz Project, a noise screening analysis was prepared and concluded that noise barriers are warranted, but not feasible for the Opitz Project. The Concessionaire, at its sole cost and expense, will be responsible for the design and construction of all required noise barriers.
 - 2. As part of the Work, the Concessionaire shall prepare final design and Noise Abatement Design Reports (NADR) in accordance with the requirements of this Section 3.3.9 for the Opitz Project. The Final Design Noise Analysis shall consist of a re-analysis of all noise sensitive receptors in the project area to confirm whether noise mitigation abatement is required.

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3. The Concessionaire shall be advised that noise abatement measures that were found to be feasible and reasonable during the preliminary noise analysis may not be found to be feasible and reasonable during the Final Design Noise Analysis. Conversely, noise barriers that were not considered feasible and reasonable may meet the established criteria and be recommended for construction.
4. The final barrier location(s) and dimension(s) will be determined during the final design noise analysis. A draft NADR shall be submitted to the Department for review and approval prior to the submittal of the final NADR. The NADR shall be furnished by the Concessionaire at its sole cost and expense. The Concessionaire shall be responsible for developing the ENTRADA for the final NADR based on the approved design and or latest design information.
5. In accordance with the results of the final NADR, the Concessionaire will provide permanent noise mitigation abatement in compliance with the Virginia State Noise Abatement Policy, the VDOT Highway Traffic Noise Impact Analysis Guidance Manual, the FHWA Highway Traffic Noise Analysis and Abatement Guidance, the VDOT Noise Report Development and Guidance Document Version 5, the Special Provision for Sound Barrier Walls, the Special Provision for Architectural Finish Concrete Form Liners and Color Stain Coating, the VDOT Soil Design Parameters for Sound Barrier Walls, Retaining Walls and Non-Critical Slopes, and the VDOT Road Design Manual.
6. Upon approval of the final NADR the Department shall prepare a concurrence letter outlining the results of the analysis for the Department's Chief Engineer and FHWA. Once concurrence is achieved, the Concessionaire shall prepare and mail letters "certified return receipt" to benefitted receptors (for barriers that are determined to be feasible and reasonable) to ascertain the desire to have those noise barriers constructed as part of the Opitz Project. In the event a sufficient number of benefitted receptors do not reply, a second mailing may be required. Upon completion of the citizen survey the Department shall prepare a second concurrence letter documenting the results, if necessary. All noise barriers should be named as presented within the NEPA Noise Analysis Technical Report noise screening analysis.
7. All noise barriers recommended for construction and concurred with by the Chief Engineer and FHWA, and approved through the public input process for benefitted receptors, are included in the scope of the Opitz Project and shall be designed, procured and constructed by the Concessionaire in accordance with the Agreement. This includes barriers with conditions, as long as those conditions have been met.
8. Prior to submitting a noise barrier wall plan for the Department's review, the Concessionaire will have the noise consultant that

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completed the NADR review the plan set and certify that the proposed design meets the noise abatement requirements. This certification will be included in the plan set when it is submitted to the Department for review.

9. If deviations in the horizontal or vertical alignment of a noise barrier are proposed following concurrence from the Chief Engineer or FHWA, then the Concessionaire shall perform any additional noise analysis and provide the results to the Department for review and approval prior to construction (to include fabrication of any unique panels or posts). This will include a plan and profile view of the roadway with the alignments recommended barrier and the proposed design. A justification of the deviation will be included with the plan set. The revised NADR chapter for the noise barrier for which modification is requested will be submitted with this additional information.
10. The Department's written approval of the barrier deviation will be required before the Concessionaire can approve AFC Documentation.
11. A key plan will be clearly labeled to show the location of the ground-mounted combo walls (noise barrier on retaining wall) and bridge-mounted noise barriers.
12. Plan view will provide the alignment of the noise barrier with the roadway plan view.
13. Profiles of the wall alignment will include the noise attenuation line and the existing and proposed elevation. If combo walls or bridge-mounted barriers are present along the alignment, the pattern of the line will be different so that all lines can be distinguished.
14. Stations of the roadway and noise barrier will be included on both the plan and profile views.
15. Noise barrier walls will be designed (including location, grading, and drainage) with a 10-foot wide maintenance area behind the walls with access for personnel and equipment. The back of the noise barrier wall shall be a minimum of 10 feet from the existing Department right of way line. If the 10-foot wide maintenance area is unavailable, requires support of excavation or right-of way acquisition, the 10-foot maintenance area dimension may be reduced as approved by the Department.
16. A minimum 3 foot wide bench of a slope of 4:1 or flatter shall be provided at the front and back of the noise wall to allow for inspection and maintenance access. The bench shall be sloped away from the wall.

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17. The color, texture, and finish of all noise barrier walls constructed on the Opitz Project Project (both the roadway side and the back side) shall be in accordance with Section 3.11.
 18. Use of access doors is not allowed unless approved by the Department. Access shall be provided via overlapping wall gaps. Gaps may be provided in the walls with a 3:1 overlap to gap ratio. If the use of access doors is approved by the Department, the Concessionaire shall provide the plans for review and approval by Department prior to fabrication. Personnel access doors shall have:
 - i. A minimum inside frame dimension of 48-inches by 86-inches;
 - ii. Stainless steel hardware, industrial grade pull handle;
 - iii. A deadbolt lock with key on both sides;
 - iv. Open away from I-95; and
 - v. A minimum 4-ft by 4-ft 4-inch thick concrete pad on both sides of the door.
 19. Noise barrier walls will have a setback from the back of the barrier no more than one foot, where feasible. The area between the barrier and wall will be filled to prevent debris from collecting in the area, if setback is one foot or less.
 20. Noise barrier wall design will be coordinated with first responders to ensure access to fire hydrants and other Emergency equipment, where feasible.
 21. The Concessionaire shall begin construction of new noise barriers within 60 days of the demolition of an existing noise barrier and/or cutting of trees which were acting as a screen for adjacent properties. The Concessionaire shall complete construction of any new noise barrier intended to replace an existing noise barrier and/or trees which were acting as a screen for adjacent properties within 180 days from the start of construction of that noise barrier.
 22. If the Concessionaire is unable to begin construction of a new noise barrier within 60 days of the demolition of an existing noise barrier and/or cutting of trees which were acting as a screen for adjacent properties, the Concessionaire shall provide temporary noise mitigation to noise sensitive receptors where the existing noise barriers and/or trees were removed.
- B. Construction Noise

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1. The Concessionaire's operations shall be performed so that exterior noise levels measured during a noise-sensitive activity shall be not more than 80 decibels. Noise-sensitive activity is any activity for which lowered noise levels are essential if the activity is to serve its intended purpose. Such activities include those associated with residences, hospitals, nursing homes, churches, schools, libraries, parks, and recreational areas.
2. Concessionaire shall monitor its construction-related noise if requested by local agencies, the Department or neighboring property owners. If construction noise levels exceed 80 decibels during noise-sensitive activities, the Concessionaire shall take corrective action before proceeding with operations.
3. The Concessionaire shall be responsible for costs associated with the abatement of construction noise and the delay of operations attributable to non-compliance with these requirements.
4. The Concessionaire is responsible for obtaining any necessary local noise ordinance variances prior to the scheduling of night time operations
5. Concessionaire shall determine whether certain portions of the Opitz Project that produce objectionable noise should be restricted or prohibited between 10 PM and 6 AM. If other hours are established by local ordinance, the local ordinance shall govern.
6. Equipment shall in no way be altered so as to result in noise levels that are greater than those produced by the original equipment. When feasible, the Concessionaire shall establish haul routes that direct his vehicles away from developed areas and ensure that noise from hauling operations is kept to a minimum.
7. These requirements are not applicable if the noise produced by sources other than the Concessionaire's operation at the point of reception is greater than the noise from the Concessionaire's operation at the same point.

3.3.10 Forests

- A. The Concessionaire shall take all reasonable precautions to prevent and suppress forest fires in any area involved in construction operations or occupied by it or its contractors as a result of such operations.
- B. The Concessionaire shall cooperate with the proper authorities of the state and federal governments in reporting, preventing, and suppressing forest fires. Labor, tools, or equipment furnished by the Concessionaire upon the order of

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any forest official issued under authority granted the official by law shall not be considered a part of the Agreement.

- C. The Concessionaire shall negotiate with the proper forest official for compensation for such labor, tools, or equipment.

3.3.11 Cultural Resources

- A. In the event that a previously unidentified historic property (prehistoric or historic district, archaeological site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places) is discovered once construction has begun, the Concessionaire shall immediately halt all construction work in the area of the resource and in surrounding areas where additional subsurface remains can reasonably be expected to occur. Work in all other areas of the Opitz Project may continue. The Concessionaire shall immediately notify the Department, which will in turn notify the FHWA. The Department and the FHWA, in cooperation with the Concessionaire, shall then address the discovery in accordance with one of the applicable processes described at 36 CFR 800.13. The Concessionaire shall be responsible for conducting any technical studies needed to determine whether the resource is eligible for inclusion on the National Register of Historic Places and whether the Opitz Project will affect the resource, and for implementing appropriate treatment as determined through FHWA's consultation with the Virginia State Historic Preservation Officer (SHPO). Subject to the exception in the Agreement, all costs associated with these technical studies and treatment actions shall be the responsibility of the Concessionaire. Pursuant to §10.1-2302 of the Code of Virginia, prior to conducting any archaeological investigations on state-controlled lands (including state-owned highway right of way), the Concessionaire must first obtain a permit from the Director of the Virginia Department of Historic Resources.
- B. In the event fossils, meteorites, or other articles of paleontological or rare mineralogical interest are discovered once construction has begun, the Concessionaire shall immediately suspend work at the site of the discovery and notify the Department. The Department will immediately notify the proper state authority charged with the responsibility of investigating and evaluating such finds. The Concessionaire shall cooperate and assist the Department in protecting, mapping, and removing the finds as determined necessary by the Department in consultation with the proper state authority.
- C. Any archaeological remains, fossils, meteorites, or other articles of paleontological or rare mineralogical interest found on state-controlled lands (including state-owned highway right of way) are the property of the Commonwealth of Virginia. Articles recovered from other than state-controlled lands are the property of the landowner unless other agreement is reached with the owner.

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- D. When the discovery of historic properties, fossils, meteorites, or other articles of paleontological or rare mineralogical interest delay the progress or performance of the Work, the Concessionaire shall notify the Department immediately.
- E. The Concessionaire shall consider historic properties to be design constraints and avoid impacting them. In addition, the Concessionaire shall notify the Department in advance of any other project-related activities, including but not limited to staging, borrow/disposal, and any temporary or permanent easements, proposed to be located on or within the viewshed of historic properties. These activities, any changes to the design, alignment, right-of-way limits, or easements, or any additions to the Project such as stormwater management facilities, stream or wetland mitigation sites, or noise barriers, may require review by the Department and could require additional cultural resources studies and/or coordination with the VA SHPO. The Concessionaire is responsible for conducting all cultural resources studies necessitated by the proposed changes, in accordance with the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation*, and the Virginia Department of Historic Resources' most current *Guidelines for Conducting Survey in Virginia*, while the Department is responsible for coordinating both the studies and the proposed changes with the VA SHPO. The Concessionaire shall then carry out any additional cultural resources commitments that result from such coordination at its sole expense and at no additional cost to the Project.

3.3.12 Not Used

3.3.13 Section 4(f) and Section 6(f) Resources

- A. The approved NEPA Document(s) concluded that there is no Use of Section 4(f) Resources on the Project, nor a Section 6(f) of the Land and Water Conservation Act of 1965 (54 U.S.C. § 200305) conversion associated with any planned or existing park or historic resource within the vicinity of the Project area.
- B. Any changes to the right-of-way or easements as shown on the Opitz Design Plans, proposed by the Concessionaire, may require additional technical studies and analysis to be performed by the Concessionaire. The Concessionaire shall be responsible for notifying the Department of plan revisions, right-of-way/easement changes, and providing any necessary studies and other necessary information to support the Concessionaire's completion of any required Section 4(f) documentation. The Department will be responsible for the coordination of any Section 4(f) documentation with FHWA. The Concessionaire shall then carry out any additional commitments that result from such coordination at its sole expense and no additional cost or time delays to the Project.

3.3.14 Threatened and Endangered Species

- A. The Categorical Exclusion (CE) document prepared for the Project determined that Threatened and Endangered (T&E) species are neither present nor will be impacted within the limits of the Project.
- B. The Concessionaire shall be advised that new and updated T&E information is continually added to agency databases. The Concessionaire shall be responsible for any subsequent coordination to obtain updated information, requirements, and clearances from environmental regulatory agencies that provide T&E species oversight. The Concessionaire shall copy the Department's District Environmental Manager on any submittals requesting concurrence from the United States Fish and Wildlife Service (USFWS) on effect determinations of federally-listed species. This additional T&E species coordination is also a standard component of the water quality permit acquisition process and may result in permit conditions for which the Concessionaire will be responsible. The Concessionaire is responsible for ensuring that all T&E species are correctly identified and impacts assessed, noting that more or less resources may be present than initially identified. Avoidance and minimization shall be implemented to the greatest extent possible. The Concessionaire shall provide to the Department copies of all documentation and correspondence with regulatory agencies.
- C. For Endangered Species Act consultation on all federally eligible projects/activities:
 - 1. The Department's District Environmental Manager must review the USFWS Project Review Package and transmittal letter prior to submittal to USFWS for informal consultation and must be copied on any submittal by non-VDOT entities.
 - 2. For formal consultation, the Department's District Environmental Manager must submit formal consultations through the FHWA. If formal consultation is required, the Concessionaire is responsible for developing or obtaining any necessary documentation to support its effect determination.

3.4 Geotechnical

3.4.1 Geotechnical Design

- A. **Geotechnical Design Engineer** – This individual shall be responsible for ensuring that all geotechnical investigations, analysis and recommendations that are necessary for the design and construction of the Opitz Project are performed in accordance with the Technical Requirements. The geotechnical design engineer shall ensure that all geotechnical design and construction

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considerations have been properly considered in the design and included in the work plans, specifications, copied notes, and constructability reviews for the Opitz Project. This individual shall have a minimum fifteen (15) years of geotechnical engineering experience and expertise working in the region and/or in areas of similar geologic settings with similar project features for this Opitz Project. The geotechnical design engineer shall be a professional engineer licensed in the Commonwealth.

- B. The minimum soil parameters to be used for design of foundations for noise barrier walls, minor retaining walls (e.g., less than 15 feet in height) and for the design of non-critical slopes (e.g., less than 25 feet in height) shall be in accordance with the standards and specifications set forth in Attachment 1.5a.
- C. The Concessionaire shall collect appropriate data for geotechnical evaluation of embankments, soil and rock cuts, culverts, bridge and wall structures, noise barriers, storm water management facilities, minor structures including drainage pipes, and any other earth-supported structures or elements of highway design and construction. The Concessionaire shall be responsible for obtaining any Regulatory Approvals required for any borings needed in performance of the Concessionaire's geotechnical investigation for the Opitz Project. The Concessionaire shall complete laboratory tests in accordance with pertinent VTM, ASTM or AASHTO standards and analyze the data to provide design and construction requirements. Soils and materials tests shall be performed by a laboratory accredited by AASHTO for each test it conducts for the Opitz Project, unless otherwise approved by the Department. The Concessionaire shall have a geotechnical engineering report approved by the Department before beginning construction.
- D. The Concessionaire shall provide to the Department records of all subsurface explorations and describe the soils encountered and their depth limits, in accordance with the requirements outlined in Chapter 3 of the Department Manual of Instructions for Materials Division and conduct the investigation in accordance with an exploratory boring plan(s) approved by the Department. Preliminary and final/design geotechnical investigations shall be performed to meet the minimum requirements set forth in Attachment 1.5a. The final geotechnical investigation plan(s) shall be in compliance with Chapter 3 of the Department's Materials Manual of Instructions, the AASHTO LRFD Bridge Design Specifications, and VDOT Modifications; and Section 700.05 (c) of the Road and Bridge Specifications unless otherwise approved by the Department. The Concessionaire shall provide electronic copies of all subsurface explorations in accordance with the boring log template available on the website address included in Chapter 3 of the Department Manual of Instructions for Materials Division. The electronic files shall be provided by a certified Professional Geologist or a suitably qualified registered Professional Engineer licensed in the Commonwealth, in gINT© software, before beginning of construction. Upon request, the Department will provide its

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gINT© and Microsoft Access file structures for the Geotechnical Database Management System.

- E. When deviating from the standards and specifications outlined in Attachment 1.5a, the Concessionaire shall incorporate reliability assessments in conjunction with standard analysis methods. An acceptable method for evaluation of reliability is given by Duncan, J.M. (April 2000) *Factors of Safety and Reliability in Geotechnical Engineering*, *Journal of Geotechnical and Geoenvironmental Engineering*, ASCE, Discussions and Closure August 2001. A suitable design will provide a probability of success equal to or greater than 99%.
- F. The Concessionaire shall provide to the Department a geotechnical design report that summarize pertinent subsurface investigations, test, and engineering evaluations. Technical specifications for construction methods that are not adequately addressed in the standards and specifications set forth in Attachment 1.5a shall be provided by the Concessionaire. The Concessionaire shall review the Construction Documentation to assure that they have appropriately incorporated the geotechnical components. The quality control-quality assurance documents shall document how each specific geotechnical recommendation or requirement is addressed in the Construction Documentation. The results of the geotechnical investigation and laboratory results shall support the design and construction efforts to meet the requirements for the pavement design set forth in Attachment 1.5a.
- G. The Concessionaire shall minimize differential settlements of the approach to a bridge for new construction and when applicable provide construction recommendations to address soil-structure interaction to accommodate the unique construction methods applied to the Opitz Project. All geotechnical work shall be completed to satisfy baseline and post- construction contract performance requirements, as described below.
- H. The Concessionaire shall design and construct pavements, subgrades, and embankments to meet the following post-construction settlement tolerances:
 - 1. Total vertical settlement less than two inches over the initial 20-years, and less than one inch over the initial 20-years within one hundred (100) feet of bridge abutments;
 - 2. Settlement that will not impede positive drainage of the pavement surface especially within the travel lanes nor subject the roadway to flooding in area where it is applicable;
 - 3. Settlement that does not result in damage to adjacent or underlying structures, including utilities; and
 - 4. For pavement sections of approach slabs, bridge decks, and tie-ins to the Project, grade tolerances shall be measured with a 10-foot straightedge.

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The variation of the surface from the testing edge of the straightedge between any two contacts with the surface shall not be more than plus (+) 0.25-inch to minus (-) 0.125 -inch at structures and (+/-) 0.25-inch at Project tie-ins.

5. Humps, depressions, and irregularities exceeding the specified tolerance will be subject to correction by the Concessionaire. The Concessionaire shall notify the Department for any non-conformance items.
- I. The Concessionaire shall consider settlement and design foundations (bridges, retaining walls, pipes and other structures) based upon requirements of the VDOT Manual of the Structure and Bridge Division.

A general note shall be placed on the Design Documentation which communicates the amount of settlement evaluated and accommodated by the structure.

- J. The total vertical and/or differential settlements of the proposed structures shall not exceed the performance tolerance noted above for pavements and of the bridge decking. In addition, angular distortion between adjacent foundations greater than 0.008 radians in simple span and 0.004 radians in continuous span structures is not permitted unless first approved by the Department.
- K. In the vicinity of existing structures, the Concessionaire shall analyze settlement and flexibility of the existing substructure elements due to additional fill and shall minimize the impact on the existing structure. In any case, the total settlement of the existing ground shall be limited to ½ inch over 20 years within 100 feet of the structure. If the reduction of total settlement is not feasible, the Concessionaire shall develop an engineered solution that isolates any existing structure(s) from the adjoining settlement.
- L. The Concessionaire's qualified geotechnical engineer shall perform an inspection of all pavement subgrades and minor structure excavations immediately prior to placement of aggregate base, subbase or bedding materials to identify excessively soft/loose or saturated soils that exhibit excessive pumping, weaving or rutting under the weight of the construction equipment. Such soils are also considered unsuitable and must be removed or modified in place to provide adequate support for embankment, pavement subgrade or minor structures.

3.4.2 Slope Design

- A. Embankments and certain aspects of retaining wall design are not addressed by LRFD. Embankments and cut slopes shall be designed in accordance with Section 305 of the Department's Materials Division's MOI. Cut and fill slopes shall be no steeper than 2H:1V, unless supported by an engineering analysis and design based on site-specific field investigation and site-specific

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laboratory strength testing. Slopes steeper than 2H:1V must be approved by the Department. All cut and fill slopes shall be designed to be stable for the interim construction stages, for the end-of-construction condition, and for design-life conditions. The Concessionaire is responsible for verifying the stability of all slopes, including those retained by structures.

- B. The following factors of safety are to be used with limit equilibrium methods of analysis to identify factors of safety for representative sections of all soil cut and soil embankment fill slope areas higher than 10 feet, and/or where slopes are supporting, or are supported by, retaining structures. The factors of safety listed in Table 3.4 are valid for subsurface investigations performed in accordance with Chapter III of the Department’s Materials Division’s Manual of Instructions or for site-specific investigation plans approved by the Department’s Materials Engineer. Approval of site-specific investigation plans with reduced boring frequency may require higher factors of safety. Table 3.4 is not applicable for rock cut slopes.

Table 3.4 Minimum Factors of Safety for Soil Cut/Fill Slopes		
Soil Slope analysis parameters based on:	Factor of Safety	
	Involves Structure or Critical Slope ¹	Non-Critical Slope
In-situ or lab. tests and measurements ^{2,3}	1.5	1.3
No site specific tests	N/A ³	1.5
<ol style="list-style-type: none"> 1. A critical slope is defined as any slope that is greater than 25 ft. in height, affects or supports a structure, or whose failure would result in significant cost for repair, or damage to, private property 2. Site specific in-situ tests include both groundwater measurements and SPT testing but may also include CPT or DMT 3. Parameters for critical slopes involving structures must be based on specific laboratory testing 4. Problem soils (fissured or heavily over-consolidated soils), must be analyzed using shear strength parameters determined from appropriate laboratory strength tests 5. Problem soils should be analyzed for short- and long-term stability using residual strength parameters obtained from laboratory shear testing. These parameters should be determined by drained direct shear tests using sufficient stress reversals to obtain large strains as discussed in the U.S. Army Corps of Engineers laboratory testing procedures EM-1110-2- 1906. Many reversals are required to reach residual strengths and some references suggest using a pre-split sample (Ref. Engineering properties of Clay Shales, Report No. 1 by W. Haley and B.N. Maclver). 6. Construction plans shall specify use of soil types consistent with the parameters used in slope analyses 		

- C. Potomac Formation clay/silts are known to be present within the limits of the proposed construction. Global and slope stability analyses of Potomac Formation clay/silts shall be analyzed using residual strength parameters for

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problem soils wherever they are encountered and/or mapped on local geologic/soils maps.

3.4.3 Pipe Installation Methods

- A. Culverts or utility pipes shall be installed by either conventional methods in accordance with Section 302.03 of the Road and Bridge Specifications, or Jack and Bore and/or by Micro-tunneling in accordance with the applicable Special Provisions. Trenchless technology other than these methods of installation is not permitted unless otherwise approved by Department. The Concessionaire's design Professional Engineer shall choose which of the methods of installation is best suited for the ground and site conditions where the work is to be performed and that will meet the design requirements of the proposed culverts or utility pipes.
- B. Any utility or storm drain installations which crosses the I-95 mainline travel lanes or ramps shall be installed using trenchless methods. Under no circumstance shall open trench installation of a utility or storm drain be allowable across any mainline travel lanes, shoulders, or ramps which are actively in use during full pipe installation (i.e. lane or ramp closures for pipe installation will not be permitted). Additional changes to traffic patterns utilized only for the installation of pipes using open cut methods shall not be permitted. The Concessionaire shall be responsible for requesting and receiving Department approval for any installations proposed to use the open cut method prior to plan submissions reflecting this work.
- C. The design Professional Engineer shall be responsible to establish both the vertical and horizontal tolerances in support of the design. Such tolerances shall be noted on the construction plans. The design tolerance may be more stringent than what is called for in the both the Jack and Bore and Micro-Tunneling Special Provisions; however, under no circumstances shall the performance requirements and design tolerances used in design of either culverts or utility pipes exceed those specified in the Road and Bridge Specifications and the applicable Special Provisions unless first approved by the Department. Performance requirements and tolerance stipulated in the Special Provision for Micro-Tunneling shall also apply to conventional tunneling methods.

3.4.4 Geotechnical Exploration Plan Submission and Approval

- A. The Concessionaire shall develop a Geotechnical Exploration Plan (GEP). Additional explorations shall be performed, as determined necessary by the Concessionaire and to meet the minimum requirements of the Project.
- B. The exploration shall meet or exceed the minimum requirements stated in Chapter III of the MOI, AASHTO LRFD Bridge Design Specifications, and AASHTO Manual on Subsurface Investigations. The Concessionaire shall determine the specific scope of the GEP (exploration locations, depths, etc.).

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- C. The Concessionaire shall conduct a meeting to review the Concessionaire's GEP prior to proceeding with the field exploration work..
- D. Following completion of exploratory work, all as-performed boring/field testing locations shall be surveyed. The survey shall determine station and offset, elevation, and state plane coordinates, which shall be included on the boring logs with accuracy as stated in MOI Chapter III. Following drilling and laboratory Work, the Concessionaire shall retain all samples until Final Completion and shall provide such samples to the Department in accordance with Section 303.06, Chapter III of the MOI.
- E. Laboratory testing of soil and groundwater samples shall be performed in accordance with AASHTO testing procedures. Laboratories conducting geotechnical testing shall be either AASHTO accredited for the testing being performed or fulfill the requirements of AASHTO R18 for qualifying testers and calibrating/verifying of testing equipment for those tests being performed. All lab test results shall be included in the Geotechnical Engineering Report.

3.4.5 Unsuitable Materials

- A. Unsuitable Material is defined as material used as embankment fill, and in cut areas to a depth of at least three (3) feet below subgrade directly beneath pavements and at least two (2) feet beneath the bedding of minor structures and laterally at least two (2) feet beyond the outside edge of the pavement shoulders and bedding limits of the minor structures that meets one or more of the following criteria: classifies as CH, MH, OH and OL in accordance with the Unified Soil Classification System (USCS); contains more than five (5) percent by weight organic matter; exhibits aggressive soil properties as deemed by the Concessionaire's geotechnical engineer; exhibits a swell greater than five (5) percent as determined from the California Bearing Ratio (CBR) test using VTM-8; exhibits strength, consolidation, durability of rock or any other characteristics that are deemed unsuitable by the Concessionaire's geotechnical engineer for use in the Work. All materials within the uppermost three (3) feet of a pavement subgrade that exhibits a CBR value less than that stipulated in the pavement design shall also be considered unsuitable.
- B. The anticipated locations and methods of treatment for unsuitable materials identified by the Concessionaire's qualified geotechnical engineer shall be shown on the design plans and cross sections as required by the Location and Design Division's Road Design Manual. Acceptable methods of treating unsuitable soils are: a) complete removal from 2 feet beyond the outside edge of shoulder on each side of the pavement or bedding limits of minor structures and replacement with structural fill; b) partial removal to at least 3 feet below final pavement subgrade or minor structure bedding elevation to within the limits noted in (a) and replacement with select material, type I, min. CBR 30 and geosynthetic material; c) raising grades with select fill and geosynthetic material to provide a minimum 2 feet of separation between these soils and final pavement subgrade or minor structure bedding; d) chemical stabilization

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of the soils to a minimum depth of 12 inches below final pavement subgrade. Highly plastic clays and elastic silts mapped as Potomac Formation or Iredell, Jackland or Jackland-Haymarket complex (problem soils) shall not be chemically stabilized. Highly plastic clays or elastic silts may be used by compacting them in confined embankment fills and capping them with at least 2 feet of suitable subgrade fill material provided these fills are adequately engineered and constructed.

- C. Saturated or very dry and/or loose or very soft coarse- and fine-grained soils that exhibit excessive pumping, weaving or rutting under the weight of construction equipment are also considered unsuitable unless they can be moisture conditioned through either mechanical or chemical means to an acceptable moisture content that allows adequate compaction to meet project specifications, and classification testing indicates they are not otherwise unsuitable. Topsoil, peat, coal and carbonaceous shale shall also be considered unsuitable material. All unsuitable material shall be disposed of and/or treated as discussed in Section 106.04 of the Road and Bridge Specifications at no additional cost to the Department. Topsoil or other organic soils are also considered unsuitable for use in embankment fill other than as a cover for slopes for the purpose of establishing vegetative cover. When used as cover for slopes, the thickness of topsoil shall not exceed twelve (12) inches.

3.4.6 Not Used

3.4.7 Vibration Control

- A. The Concessionaire shall control vibrations in accordance with the requirements of the *Monitoring of Adjacent Structures During Construction Special Provision* included in Attachment 1.5a. In addition to private/adjacent properties, this includes structures under construction, structures owned by the Department, and structures constructed by the Concessionaire within the scope of the Opitz Project. Adjacent structures shall be defined as structures within a 200' radius of driving, drilling, or excavation activities. The Concessionaire shall be responsible for providing vibration monitoring and repairing any and all damage to adjacent facilities and structures for construction-induced damage. The Concessionaire shall provide vibration monitoring data reports to the Department.

3.4.8 Coordination and Review by Geotechnical Engineer

- A. The Concessionaire's geotechnical engineer of record shall identify the elements of the Project in which the geotechnical engineer or their qualified designated representative is required to monitor/inspect during construction to ensure that the completed Project will function in accordance with the design intent over its expected lifetime. This shall include, but not limited to foundation subgrades, installation and load testing of deep foundations, embankment and pavement subgrades, instrumentation and monitoring of settlement, assessment and treatment for potential weak or unsuitable soils,

rock excavation and rock slopes, and retaining structures that include tie-backs and anchors. A complete listing of these elements shall be included as part of the QMSP.

3.5 Materials

3.5.1 Rights for and Use of Materials Found on the Opitz Project

- A. With approval of the Department, the Concessionaire may use in the Opitz Project any materials found in the excavation that comply with the standards and specifications set forth in Attachment 1.5a. The Concessionaire shall replace at its own expense with other acceptable material the excavation material removed and used that is needed for use in embankments, backfills, approaches, or otherwise, unless used on the Opitz Project. The Concessionaire shall not excavate or remove any material from within the construction limits that is not within the grading limits, as indicated by the slope and grade lines. The Concessionaire shall not waste, bury, deposit, or abandon any material within the Opitz Project limits.

3.5.2 Not Applicable

3.5.3 Not Applicable

3.5.4 Not Applicable

3.5.5 Samples, Tests, and Cited Specifications

The Concessionaire is responsible for quality control, quality assurance, and ensuring compliance with the Technical Requirements. The Department, at its discretion, may conduct testing and audits in its performance of Oversight Services.

3.5.6 Material Delivery

The Concessionaire shall advise the Department at least two weeks prior to the delivery of any material from a commercial source. Upon delivery of any such material to the Opitz Project, the Concessionaire shall confirm that the material meets the requirements of the Technical Requirements and, if so, shall provide the Department with one copy of all invoices (prices are not required).

3.5.7 Plant Inspections

If the Department inspects materials at the source, the following conditions shall be met:

- A. The Department shall have the cooperation and assistance of the Concessionaire and producer of the materials.
- B. The Department shall have full access to parts of the plant that concern the manufacture or production of the materials being furnished.

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- C. The Concessionaire shall arrange and bear any cost associated with travel and lodging for the Department to witness factory acceptance testing (FAT) of TMS, ETTM Equipment and ETTM System which occurs more than 200 miles from the Opitz Project site.

3.5.8 Storing Materials

- A. Materials shall be stored in a manner so as to ensure the preservation of their quality and fitness for the Work. When considered necessary by the QAM or the Department, materials shall be stored in weatherproof buildings on wooden platforms or other hard, clean surfaces that will keep the material off the ground. Materials shall be covered when directed by the Department. Stored material shall be located so as to facilitate its prompt inspection. Portions of the Opitz Project Right of Way approved by the Department may be used for storage of material and equipment and for plant operations. However, equipment and materials shall not be stored within the clear zone of the travel lanes open to traffic.
- B. Additional required storage space shall be provided by the Concessionaire. Private property shall not be used for storage purposes without the written permission of the owner. Copies of the written permission shall be furnished to the Department. Upon completion of the use of the property, the Concessionaire shall furnish to the Department a release signed by the property owner indicating that the property has been satisfactorily restored.
- C. Chemicals, fuels, lubricants, bitumens, paints, raw sewage, and other harmful materials as determined by the QAM or the Department shall not be stored within any floodplain unless no other location is available and only then shall the materials be stored in a secondary containment structure(s) with an impervious liner. Also, any storage of these materials in proximity to natural or man-made drainage conveyances or otherwise where the materials could potentially reach a waterway if released under adverse weather conditions, must be stored in bermed or diked area or inside a container capable of preventing a release. Double-walled storage tanks shall meet the berm/dike containment requirement except for storage within flood plains. Any spills, leaks, or releases of such materials shall be addressed in accordance with the Agreement. Accumulated rain water may also be pumped out of the impoundment area into approved dewatering devices.
- D. ETTM, electronic devices, network and computer gear shall be stored in an environmentally controlled space as might be required in accordance with manufacture's recommendation.

3.5.9 Handling Materials

Materials shall be handled in a manner that will preserve their quality and fitness for the Work. Aggregates shall be transported from storage to the Work in vehicles constructed to prevent loss or segregation of materials.

3.5.10 Unacceptable Materials

Materials that do not conform to the Technical Requirements shall be considered unacceptable. Such materials, whether in place or not, will be rejected and shall be removed from the site of the Work. If it is not practical for the Concessionaire to remove rejected material immediately, the Concessionaire will mark the material for identification. Rejected material whose defects have been corrected shall not be used until approval has been given by the Department in accordance with the QMSP.

3.5.11 Not Used

3.5.12 Local Material Sources (Pits and Quarries)

- A. Local material sources, other than active commercial sand and gravel and quarry operations, opened by the Concessionaire or its subcontractors shall be concealed from view from the completed roadway and any existing public roadway. Concealment shall be accomplished by selectively locating the pit or quarry and spoil pile, providing environmentally compatible screening between the pit or quarry site and the roadway, or using the site for another purpose after removal of the material, or restoration equivalent to the original use (such as farm land, pasture, or turf).
- B. Should the Concessionaire wish to source construction materials from (non-commercial) new pits or quarries the Concessionaire shall furnish the Department a statement signed by the property owner in which the property owner agrees to the use of their property as a source of material for the Opitz Project. Upon completion of the use of the property as a material source, the Concessionaire shall furnish the Department a release signed by the property owner indicating that the property has been satisfactorily restored. This requirement will be waived for commercial sources, sources owned by the Concessionaire, and sources furnished by the Department.
- C. Local material pits and quarries that are not operated under a local or State permit shall not be opened or reopened without authorization by the Department.

3.5.13 Materials Disposal

- A. Unsuitable or surplus material shall be disposed of by the Concessionaire off the Opitz Project Right of Way. The Concessionaire shall obtain the necessary rights to property to be used as an approved disposal area. An approved disposal area is defined as that which is owned privately, not operated under a local or State permit and has been approved by the Department for use in disposing unsuitable or surplus material.
- B. Disposal areas shall be cleared but need not be grubbed. The clearing work shall not damage grass, shrubs, or vegetation outside the limits of the approved area and haul roads thereto. After the material has been deposited, the area

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shall be shaped to minimize erosion and siltation of nearby streams and landscaped in accordance with the approved plan for such work or shall be used as approved by the Department. The Concessionaire's design and restoration shall conform to the requirements of the Agreement.

- C. The Concessionaire shall furnish the Department a statement signed by the property owner in which the owner agrees to the use of their property for the deposit of material from the Opitz Project. The property owner will hold harmless the Department, their officers, their agents, and their employees. Upon completion of the use of the property as an approved disposal area, the Concessionaire shall furnish the Department a release signed by the property owner indicating that the property has been satisfactorily restored. This requirement will be waived for commercial sources and sources owned by the Concessionaire.
- D. The Concessionaire will obtain a VPDES Construction Permit as well as any other applicable permits for a disposal area, which shall be in compliance with the standards and specifications set forth in Attachment 1.5a.
- E. The Concessionaire shall dispose of all defunct TMS, ETTM, cable, devices, electric, and electronic equipment properly and provide documentation to the Department.

3.6 Drainage, Erosion and Siltation, and Stormwater Management

3.6.1 Drainage

- A. The criterion detailed herein is shown in the Department's Drainage Manual and associated Instructional and Informational Memoranda (IIM) and shall be used to provide for flood protection, drainage design, erosion and sediment control, and stormwater management. All other hydraulic criteria not referenced herein, including but not limited to, increases in existing flood levels, bridge scour protection, protection of downstream waterways, upstream and downstream property impacts, and compliance with environmental and safety requirements, shall be in accordance with the Attachment 1.5a.
- B. The Opitz Project will be governed by the Part II-B Technical Criteria under the VSMP Regulations. Final Design Documentation for any hydraulic design shall include a complete set of final drainage computations sealed and signed in accordance with latest IIM-243.
- C. The drainage design will include but not be limited to enclosed storm sewer systems, curb inlets, drop inlets, stormwater management systems for water quality and water quantity, manholes, junction boxes, culverts, headwalls, channels, ditches, bridge drainage assemblies and structures that remove and transport runoff or convey stream flows, adequate outfalls, and erosion and sediment control. These efforts shall be in compliance with the Attachment 1.5a.

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- D. The Concessionaire will prepare drainage design criteria and a list of software packages to be used in the design prior to commencement of Work for review and approval by the Department.
- E. The Concessionaire will assemble and review all available data, studies, and development plans impacting the Opitz Project corridor for use in preparing the drainage design. The Concessionaire will perform a hydrologic and hydraulic analysis within the limits of the Opitz Project and extend the analysis to include all offsite areas that will drain through or impact the Opitz Project.
- F. The Concessionaire shall design and install new drainage facilities and will be permitted to use existing drainage systems that have adequate hydraulic capacities and adequate structural integrity in accordance with applicable standards and specifications set forth in Attachment 1.5a. Existing drainage assets determined not to be needed for the Concessionaire's drainage design or other Department use, as determined by the Department, shall be abandoned in place or removed by the Concessionaire at its sole cost.
- G. All existing drainage facilities within the Opitz Project Right of Way that are adversely impacted by the Concessionaire's activities and that the Concessionaire intends to leave in place shall be evaluated and verified to have adequate hydraulic capacity for the ultimate land use condition in accordance with the VDOT Drainage Manual at the Concessionaire's cost. The evaluation of existing drainage facilities shall be based on the applicable design storm frequency per the current Department criteria.
- H. The Concessionaire shall provide the Opitz Drainage Existing Condition Assessment Report to the Department for review and approval prior to proceeding to final design. The report shall include all the pipes that the Concessionaire intends to leave in place for continued use and also the pipes which will be subjected to additional embankment, and/or live loading. The report shall include a certification from the Concessionaire's structural engineer attesting to the structural adequacy of the structures and specific recommendations relative to improvements to the structural condition and serviceability of the structures.
- I. If any existing drainage facility within the Opitz Project Right of Way is not utilized as a functional element in the proposed drainage design or adversely impacted by Opitz project, but is determined to be structurally or hydraulically deficient, then the Department shall determine whether to rehabilitate/replace the drainage system to ensure a continued service life of 70 years or leave as is. Where the Department desires the Concessionaire to carry out the rehabilitation, the Concessionaire will produce a proposal for the work required and agree with the Department on a schedule and cost for carrying out such work as a Department Change.
- J. The Concessionaire shall provide for new storm water management facilities and the replacement of capacity for any existing storm water management

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facilities that may be removed in accordance with applicable standards and specifications set forth in Attachment 1.5a and Section 3.6.3 of these Technical Requirements.

- K. No drainage inlet grate or at-grade structure will be permitted to be located or extend within the travel way of the Interstate or the associated Interstate ramps, unless approved by the Department.
- L. Prior to the commencement of construction Work, the Concessionaire will determine all existing drainage facilities the Concessionaire intends to utilize and leave in place for continued use. The Concessionaire shall perform such activities as may be necessary to cause such facilities to be completely clean and free of debris and silt prior to the commencement of construction Work on or near such existing drainage facilities. The Concessionaire shall be responsible, at its sole cost and expense, for cleaning any debris or silt accumulation caused by performance of the construction Work from all (pre-existing and new) Opitz Express Lanes drainage facilities.
- M. As part of the Work, the Concessionaire may tie in or connect new drainage assets it is designing and constructing to existing drainage assets present along the I-95 Corridor as of the Agreement Date. If there is an existing drainage asset the Concessionaire desires to tie in or connect to, but is prevented from doing so because of physical damage to such existing drainage asset not caused by or attributable to the Concessionaire's activities, the Concessionaire shall repair or replace the existing drainage asset in the immediate area of the proposed tie-in or connection so it can perform the proposed tie-in or connection. Any such repair or replacement work shall be completed in accordance with the standards and specifications set forth in Attachment 1.5a.
- N. The above provisions shall not apply if the hydraulic capacity or structural loading of the existing drainage asset to which the Concessionaire desires to connect is verified to be inadequate by the Concessionaire as a result of the proposed tie-in or connection. In that case, the Concessionaire shall, at its sole cost and expense, replace, repair, or otherwise upgrade the existing drainage asset (in accordance with the standards and specifications set forth in Attachment 1.5a) in order to accommodate the proposed tie-in or connection.
- O. All existing culverts, storm sewer, and drainage appurtenances to be abandoned shall be removed and backfilled or filled and plugged with flowable fill.
- P. See Structures and Bridge Section 3.15 of these Technical Requirements for bridge deck drainage requirements.
- Q. For all impacted permanent structures, the bridge, hydrology, hydraulics, and scour requirements shall be in accordance with the requirements set forth in Attachment 1.5a, including but not limited to AASHTO LRFD Bridge Design

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Specifications and VDOT Modifications (the more stringent requirements shall govern).

- R. The Concessionaire will perform a comprehensive Hydrologic and Hydraulic Design Analysis (H&HA) for impacted major culvert and/or bridge-crossing locations where the 100-year discharge is 500 cfs or more, and/or floodplain studies have been published by federal agencies. The outline for the H&HA will be in accordance with the standards and specifications set forth in Attachment 1.5a. The Concessionaire will ensure the H&HA is coordinated with the bridge design when bridges over waterways are involved. The Concessionaire will deliver the final H&HA to the Department for review and approval prior to the commencement of construction at each impacted major culvert and/or bridge crossing location.
- S. The scour analysis and reporting shall be in accordance with the standards and specifications set forth in Attachment 1.5a and shall include all existing structures undergoing major rehabilitation and new and replacement bridges at stream crossings. The scour profile shall also include the effects of existing adjacent bridges and the effect of the new bridge on the existing adjacent bridge. Countermeasures to accommodate scour at existing piers shall only be used when approved by the Department. Scour countermeasures shall be provided at existing and new abutments in accordance with the standards and specification as set forth in Attachment 1.5a.
- T. The Concessionaire will perform a scour analysis on all new retaining walls parallel to stream flow or subject to longitudinal scour. Retaining walls subject to longitudinal scour will be designed to withstand the 500-year super flood scour without the aid of scour countermeasures, unless otherwise agreed by the Department. Appropriate bank protections and revetments are required for walls subject to flows and potential bank erosion.
- U. During the Work period the Concessionaire shall provide for positive drainage of all roadway facilities open to construction traffic. Construction activities shall not redirect or add drainage run-off to a private property.
- V. Where justified by site conditions within the Opitz Project corridor, the Concessionaire may submit a design for the slotted barrier drains and trench drains for Department review and acceptance. However, for all other locations and the general purpose lanes, such use of slotted barrier drains and trench drains would not be accepted.
- W. Metal pipes shall not be utilized for permanent installations.

3.6.2 Erosion and Siltation

- A. The Concessionaire will develop and implement an erosion and sediment control plan, a stormwater pollution prevention plan and a post development stormwater management plan in compliance with the Department's approved

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Erosion and Sediment Control and Stormwater Management Standards and Specifications. The Concessionaire shall comply with the Department's Approved Erosion and Sediment Control Standards and Specifications (including IIM 11, IIM 246 and the Department's Drainage Manual, Chapters 10 and 11).

- B. The Concessionaire shall exercise temporary and permanent measures, throughout the Term, to control erosion and prevent or minimize siltation of rivers, streams, lakes, and impoundments. Erosion and sediment control measures will be installed in accordance with applicable standards and specifications set forth in Attachment 1.5a.
- C. Erosion and sediment control measures shall be applied to erodible material exposed by any activity associated with construction, including local material sources, stockpiles, disposal areas, and haul roads. Temporary measures shall be coordinated with the Work to ensure effective and continuous erosion and siltation control. Permanent erosion control measures and drainage facilities shall be installed and operational as the Work progresses before temporary measures are removed.
- D. Erosion and siltation control devices and measures shall be maintained in a functional condition at all times. The Concessionaire shall have, within the limits of the Opitz Project during all land disturbing activities, an employee certified by the Department in Erosion and Sediment Control who shall inspect erosion and siltation control devices and measures for proper installation and deficiencies immediately after each rainfall, at least daily during prolonged rainfall, and weekly when no rainfall event occurs. The Concessionaire shall make a daily review of the location of silt fences and filter barriers to ensure that they are properly located for effectiveness. Deficiencies shall be corrected immediately. Such employee shall also be certified through the Department of Environmental Quality Inspection Certification Program.
- E. Failure on the part of the Concessionaire to maintain appropriate erosion and siltation control devices in a functioning condition may result in the Department notifying the Concessionaire in writing of specific deficiencies. The Concessionaire shall correct or take appropriate actions to correct the specified deficiencies within 24 hours after receipt of such notification.
- F. Failure of the Concessionaire to maintain a Department-certified Erosion and Sediment Control employee within the Opitz Project Right of Way will result in a Opitz Project non-compliance and suspension of Work related to any land disturbing activity until such time as a certified Erosion and Sediment Control employee is present on the Opitz Project.
- G. Except as set forth in the Agreement, the Concessionaire shall be responsible for all costs, fines, penalties, and delays associated with any non-compliant items.

3.6.3 Storm Water Pollution Prevention Plan and Virginia Stormwater Management Program General Permit for the Discharge of Stormwater from Construction Activities

- A. The Concessionaire shall develop and provide for the Department’s review and approval a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP is comprised of, but not limited to, an Erosion and Sediment Control (ESC) Plan and Narrative, a Pollution Prevention (P2) Plan, a post construction Stormwater Management (SWM) Plan, and the related specifications and standards contained within the Agreement. The SWPPP shall be prepared and implemented by the Concessionaire in compliance with applicable requirements of the standards and reference documents contained within the Agreement including the Virginia Erosion and Sediment Control Law and Regulations, the Virginia Stormwater Management Act (VSMA), and the Virginia Stormwater Management Program (VSMP) Regulations. The Opitz Project will be subject to the Part II-B Technical Criteria in the VSMP Regulations (9VAC25-870). A SWPPP shall be required for all land-disturbing activities that disturb 10,000 square feet or greater, or 2,500 square feet or greater in a Chesapeake Bay Preservation Area. Land-disturbing activities that disturb 1 acre or greater require coverage under the Department of Environmental Quality’s Virginia Pollutant Discharge Elimination System (VPDES) General Permit for the Discharge of Stormwater from Construction Activities (“VPDES Construction Permit”). Where applicable, the Concessionaire will apply for and retain coverage under the VPDES Construction Permit for those land disturbing activities for which it has control. The required contents of a SWPPP for those land disturbance activities requiring coverage under the VPDES Construction Permit are found in Part II-A of the General Permit section of the VSMP Regulations (9VAC25-880-70).
- B. A working conceptual ESC and post construction SWM plan and SWPPP for the entire Opitz project must be reviewed and approved by the Department prior to the Concessionaire applying for coverage under the VPDES General Construction Permit. This initial Plan Submittal shall include the proposed total expected Land Disturbance Area and Land Development Area, including off-site facilities, for the entire Project. Such plans shall be prepared in accordance with the standards and specifications set forth in Attachment 1.5a and submitted to the Department for its approval before the commencement of any land disturbing activities. The SWPPP, including ESC Plan and SWM Plan, shall be kept current as design work progresses. Updated versions of the SWPPP, including ESC Plan, and SWM Plan, must be submitted to the Department for its review and approval before the Department will approve AFC Documents. The Concessionaire shall be responsible for reading, understanding, and complying with all the terms, conditions and requirements of the permit and the SWPPP, including the following:

1. **Opitz Project Implementation Responsibilities.** The Concessionaire shall be responsible for the installation, maintenance,

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inspection, and, on a daily basis, ensuring the functionality of all erosion and sediment control measures and all other stormwater and pollutant runoff control measures identified within or referenced within the SWPPP, plans, specifications, permits, and elsewhere in the Agreement, including these Technical Requirements. The Concessionaire shall take all reasonable steps to prevent or minimize any stormwater or non-stormwater discharge that will have a reasonable likelihood of adversely affecting human health or public and/or private properties.

2. **Certification Requirements.** In addition to satisfying the personnel certification requirements contained herein, the Concessionaire shall certify its activities by completing, signing, and submitting Form C-45 VDOT SWPPP Contractor and Subcontractor Certification Statement to the Department at least seven days prior to commencing any Opitz Project related land- disturbing activities, both on-site and off-site.
3. **SWPPP Requirements for Support Facilities.** The Concessionaire shall develop a SWPPP with an ESC Plan, a P2 Plan, and a SWM Plan for submission and acceptance by the Department prior to usage of any on-site or off-site support facilities, including borrow and disposal areas, construction and waste material storage areas, equipment and vehicle storage and fueling areas, storage areas for fertilizers or chemicals, sanitary waste facilities, and any other areas that may generate a stormwater or non-storm water discharge related to performance of the Work. Such plans shall document the location and description of potential pollutant sources from these areas and shall include a description of the controls to reduce, prevent and control pollutants from these sources including spill prevention and response. The Concessionaire shall submit such plans and documentation as specified herein to the Department for review and approval with the initial Plan Submittal. If the VPDES permit was previously applied for without including the Support Facilities, the Concessionaire will need to revise the SWPPP and may need to file a VPDES permit modification.
4. **Reporting Procedures**
 - i. **Inspection Requirements.** The Concessionaire shall be responsible for conducting inspections in accordance with the requirements herein. The Concessionaire shall document such inspections by completion of Form C-107, Construction Runoff Control Inspection Form and Continuation Sheet, in strict accordance with the directions contained within the form.
 - ii. **Unauthorized Discharge Requirements.** The Concessionaire shall not discharge into state waters sewage, industrial wastes,

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other wastes or any noxious or deleterious substances nor shall otherwise alter the physical, chemical, or biological properties of such waters that render such waters detrimental for or to domestic use, industrial consumption, recreational or other public uses.

- iii. **Notification of non-compliant discharges.** The Concessionaire shall immediately notify the Department upon the discovery of, or potential of, any unauthorized, unusual, extraordinary, or non-compliant discharge from the land disturbing activity. Where immediate notification is not possible, such notification shall be not later than 24 hours after said discovery.
- iv. **Detailed report requirements for non-compliant discharges.** The Concessionaire shall submit to the Department within five days of the discovery of any actual or potential non-compliant discharge, a written report describing details of the discharge to include its volume, location, cause, and any apparent or potential effects on private and/or public properties and state waters or endangerment to public health, as well as steps being taken to eliminate the discharge. A completed Form C-107 shall be included in such reports.

5. **Changes, Deficiencies and Revisions**

- i. **Changes and Deficiencies.** The Concessionaire shall report to the Department when any planned physical alterations or additions are made to the land disturbing activity or deficiencies in the Opitz Project plans or the Agreement, including these Technical Requirements are discovered that could significantly change the nature or increase the quantity of the pollutants discharged from the land disturbing activity to surface waters.
- ii. **Revisions to the SWPPP.** Where site conditions or construction sequencing or scheduling necessitates revisions or modifications to the erosion and sediment control plan, storm water management plan, or any other component of the SWPPP for the land disturbing activity, such revisions or modifications shall be approved by the Department and shall be documented by the Concessionaire on a designated plan set. Such plans shall be kept on the Opitz Project site at all times and shall be available for review upon request. If a revision to the SWPPP results in a significant increase to the project Land Disturbance Area, the Concessionaire, in consultation with DEQ, may need to file a VPDES permit modification.
- iii. The Concessionaire shall prepare a post-construction Storm Water Management (SWM) Plan for the entire Opitz Project.

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Plans shall be prepared in accordance with the Standard Documents and submitted to the Department for its review and acceptance before any land disturbing activity.

6. Where the Project will be constructed in segments, the Concessionaire shall submit a finalized ESC Plan, a post construction SWM Plan and a P2 Plan, including the expected Land Disturbance Area, for the proposed initial work segment in addition to the conceptual plan for the entire Project. It is expected that the individual work segment submittals will be self-sustaining and not incur a deficit in post construction SWM design requirements requiring mitigation on future work segments. Subsequent work segment submittals shall include required modifications to the Land Disturbance Area value. However, these modifications, in total, shall not exceed the initially submitted Land Development Area value.
7. The Concessionaire shall not proceed with work to be covered by the permit until permit coverage is secured and the Department Project Manager releases the work in writing. Any request for an exception from the technical criteria of the VSMP regulation shall be coordinated and approved prior to receiving permit coverage. It is noted that permit coverage, and subsequent release of work, can take up to ninety (90) days from the time that the Concessionaire submits a request for coverage that includes all required information. The Concessionaire shall provide a completed SWPPP Certification form (LD-455E) before commencement of any land disturbing activity and shall complete and include the SWPPP General Information Sheets in the plan assembly per in accordance with the Department's Drainage Manual. The SWPPP Certification form (LD-455E) and SWPPP General Information Sheets shall be updated with each work segment submittal as necessary.
8. The Concessionaire shall be responsible for compliance with construction-related permit conditions and shall assume all obligations and costs incurred by complying with the terms and conditions of the permit. Any fines associated with permit or regulatory violations shall be the responsibility of the Concessionaire. Upon completion of the entire regulated land disturbing activity (including final stabilization of all disturbed areas), the Concessionaire shall provide updated/revised Permanent Best Management Practice (BMP) information in Section VI of the SWPPP General Information Sheets for each post construction BMP placed into service on the Project, provide As-Built drawings of all post-construction stormwater management facilities located on the Project, complete the VPDES Construction Permit Termination Notice form (LD-445D) and submit both documents (without signature) to the Department Project Manager for processing. The

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Concessionaire shall also have on-site during any land disturbing operations an individual or individuals holding a VDEQ Inspector Certification, a VDEQ Responsible Land Disturber (RLD) Certification and a VDOT Erosion and Sediment Control Contractor Certification (ESCCC) to ensure compliance with all VDEQ and VDOT erosion and sediment control plan implementation requirements. It shall be the responsibility of the Concessionaire's certified ESCCC representative and the Concessionaire's VDEQ certified ESC Inspector to monitor Project compliance with the approved SWPPP. The Concessionaire's VDEQ certified ESC Inspector must represent the Quality Assurance firm for the Project. The inspections carried out by the Concessionaire's certified ESCCC representative and the Concessionaire's VDEQ certified ESC Inspector shall be in accordance with the VDOT *Minimum Requirements for Quality Assurance & Quality Control on Design-Build & Public-Private Transportation Act Projects (July 2018)*. The inspections shall be documented and certified by both the Concessionaire's ESCCC representative and the Concessionaire's VDEQ certified ESC Inspector on the Construction Runoff Control Inspection Form (C-107 Part I).

- C. The Concessionaire shall be responsible for the design and construction of stormwater management facilities as required for the Project in accordance with the latest version of IIM-LD-195, and the other standards and reference documents listed in Attachment 1.5a, including the Virginia Stormwater Management Program Act and the Virginia Stormwater Management Program (VSMP) Regulation, and shall comply with the minimum geotechnical requirements contained therein. The Concessionaire, as a part of final design, shall develop a final post-construction stormwater management plan and construct facilities that meet all applicable requirements.
- D. The Concessionaire is to ensure proper ingress and egress to any stormwater management facility and that any specific proprietary facilities have proper maintenance details included in the As-Built Plans. When maintenance access can only be provided from a limited access roadway, a locked gate shall be provided.

3.7 Roadway Design

3.7.1 General Requirements

- A. The Concessionaire will prepare the final geometric design of the roadway elements in accordance with Good Industry Practice. Functional classifications for roadways and specific design criteria on the Opitz Project are to be developed per the standards and specifications set forth in Attachment 1.5a.
- B. Except as outlined in design exceptions and design waivers, the design speed for the Opitz portion of the 95 Express Lanes shall be 65 miles per hour and

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the the existing I-95 general purpose lanes shall be 70 miles per hour. The design speed for all exit or entrance ramps and roadways shall meet AASHTO criteria as shown in the following table:

Opitz Project Design Speeds	
Roadway	Design Speed
I-95 Northbound and Southbound General Purpose Lanes	70 mph
Opitz Boulevard	45 mph
Opitz Boulevard Connector Ramp (OBTR)	50 mph
I-95 Southbound to 95 Express Southbound Slip Ramp (DBSR)	50 mph

- C. Except as outlined in design exceptions and design waivers, the Opitz portion of the 95 Express Lanes and shoulders, and the I-95 general purpose lanes and shoulders shall meet the Department’s criteria for freeways, as described in the standards and specifications set forth in Attachment 1.5a. The widths of reversible shoulders shall be equal and meet the wider criteria established in the Department and FHWA criteria.
- D. Concessionaire will have the flexibility to propose revised designs that produce time and cost benefits to the Department and/or the Concessionaire without impairing the essential functions and characteristics of the design, including safety, traffic operations, desired appearance, maintainability, environmental protection, drainage, and the constraints of any Regulatory Approvals. In accordance with the Agreement, the Technical Requirements, or the above conditions, the Department will have the right to accept or reject such revised design criteria or designs.
- E. Reversible ramp shoulder widths shall be the same width on both sides of the ramp and shall meet or exceed the widths cited in VDOT IIM-LD-227.
- F. All new and existing ramps shall be designed with a parallel design. Acceleration and deceleration lengths shall be designed to meet AASHTO requirements including operational characteristics of the ramp.
- G. In order to preclude toll violations and wrong-way access, Concessionaire shall provide a continuous physical barrier system throughout the corridor. Cross-overs from the GP lanes to HOT Lanes will utilize channelizing posts consistent with those in use on the 95 Express Lanes to deter unauthorized use. The Department will have the final approval on the location and type of such barrier system.
- H. The Concessionaire shall be responsible for compliance with applicable commitments made in the Opitz Interchange Access Report.

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- I. Where Standard MC-3B Asphalt Curb is used in conjunction with paving under guardrail on high fills, high fills shall be defined as fill heights over 7.5 feet.
- J. The MGS-1/1A standard shall be applied to all areas of guardrail installation, including those along I-95 SB and NB general purpose lanes.

3.7.2 Requirements for Operational Analysis

- A. The Concessionaire shall provide an operational analysis for any changes to the Opitz Project designs as presented in the Opitz Design Plans and/or the Opitz Interchange Access Report (IAR) and the analysis shall require an amendment to the Opitz Project Interchange Access Report.
- B. The operational analysis shall demonstrate that the Concessionaire's revised design does not have an adverse impact on the safety and operation of the existing and proposed facility based on an analysis of current and future design year traffic. Traffic and operational analysis shall conform to the requirements of IIM-LD-200 *Access Points to Limited Access Highways (Interchange Access Report Guidance)*.

3.8 Pavement

3.8.1 Minimum Pavement Sections

- A. Pavement designs must meet the requirements of this Section 3.8.1. The Concessionaire may propose changes to the specified minimum pavement section(s) for the Express Lanes travel lanes that either a) increases the thickness of the base or subbase layers specified below or b) uses an alternative base, drainage, and/or subbase layer type and thickness that meets or exceeds the Structural Number of the minimum pavement section(s) specified below without compromising long-term strength or durability. Use of a consistent pavement design for Express Lanes travel lanes and shoulders for the entire length of the Project is required. Shoulder pavement designs shall also meet the requirements of Section 3.8.1.H. Changes to the minimum pavement section(s) that rely on a CBR value that exceeds the requirements of Section 3.8.1.G are not acceptable.
- B. The Concessionaire shall prepare and incorporate into the plans, typical sections, profiles, and cross-sections with the validated pavement sections in accordance with the applicable manuals noted in Attachment 1.5a. This includes drainage and subdrainage requirements to ensure positive drainage both within the pavement structure and on the pavement surface.
- C. All existing paved shoulders and existing gore areas shall be cut with a smooth vertical face to expose the full depth of the existing mainline pavement structure, demolished and reconstructed with the mainline I-95 pavement

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section identified below. All underdrains beneath the existing paved shoulders shall be removed and replaced to the nearest available outlet.

- D. All travel lane and shoulder pavements shall be constructed or resurfaced in accordance with the pavement criteria below:

Facility	Minimum New Travel Lane Pavement Requirements	Minimum Existing Pavement Resurfacing Requirements	Minimum New Shoulder Pavement Requirements
95 Express Lanes and Ramps	<ul style="list-style-type: none"> • <u>Surface</u>: 2.0 inches of Asphalt Concrete Surface Course SM-12.5E • <u>Intermediate</u>: minimum 2.0 inches of Asphalt Concrete Intermediate Course IM-19.0D • <u>Base</u>: minimum 11.0 inches of Asphalt Concrete Base Course BM-25.0A • <u>Subbase</u>: 15.0 inches of Aggregate Base Material, Type 1, Size No. 21B 	<ul style="list-style-type: none"> • Where existing pavement markings and/or existing snow plowable raised pavement markers that conflict with the proposed pavement marking design are to be eradicated and removed or the pavement is behind barrier and not subjected to traffic, the existing pavement shall be milled and overlaid to the following depths and materials up to the nearest longitudinal lane divide: <ul style="list-style-type: none"> ○ <u>Milling Existing Pavement</u>: minimum 2.0 inches ○ <u>Surface</u>: 2.0 inches of Asphalt Concrete Surface Course SM-12.5E 	<ul style="list-style-type: none"> • <u>Surface</u>: 2.0 inches of Asphalt Concrete Surface Course SM-12.5E • <u>Intermediate</u>: minimum 2.0 inches of Asphalt Concrete Intermediate Course IM-19.0D • <u>Base</u>: minimum 11.0 inches of Asphalt Concrete Base Course BM-25.0A • <u>Subbase</u>: 15.0 inches of Aggregate Base Material, Type 1, Size No. 21B

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Facility	Minimum New Travel Lane Pavement Requirements	Minimum Existing Pavement Resurfacing Requirements	Minimum New Shoulder Pavement Requirements
I-95 General Purpose Lanes and Ramps	<ul style="list-style-type: none"> • <u>Surface</u>: 2.0 inches of Asphalt Concrete Surface Course SM-12.5E • <u>Intermediate</u>: minimum 2.0 inches of Asphalt Concrete Intermediate Course IM-19.0A • <u>Base</u>: minimum 11.0 inches of Asphalt Concrete Base Course BM-25.0A • <u>Drainage</u>: 4.0 inches of Aggregate Base Material, Type 1, Size No. 21B • <u>Subbase</u>: 6.0 inches of Aggregate Base Material, Type I, Size No. 21A, pugmill mixed with 4% hydraulic cement by weight 	<ul style="list-style-type: none"> • For use as a travel lane, existing shoulder pavement after proposed wedge and level must be resurfaced to the following depths and materials: <ul style="list-style-type: none"> ○ <u>Milling Existing Pavement</u>: minimum 4.0 inches ○ <u>Surface</u>: 2.0 inches of Asphalt Concrete Surface Course SM-12.5E ○ <u>Wedge and Leveling</u>: minimum 2.0 inches of Asphalt Concrete Intermediate Course IM-19.0A • Where existing pavement markings and/or existing snow plowable raised pavement markers are to be eradicated and removed for temporary lane shifts, the existing pavement shall be milled and overlaid to the following depths and materials up to the nearest longitudinal lane divide: <ul style="list-style-type: none"> ○ <u>Milling Existing Pavement</u>: minimum 2.0 inches ○ <u>Surface</u>: 2.0 inches of Asphalt Concrete Surface Course SM-12.5E 	<ul style="list-style-type: none"> • Same as Minimum New Travel Lane Pavement Requirements • Paving adjacent to guardrail shall be in accordance with VDOT standard MC-4

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Facility	Minimum New Travel Lane Pavement Requirements	Minimum Existing Pavement Resurfacing Requirements	Minimum New Shoulder Pavement Requirements
Opitz Boulevard	<ul style="list-style-type: none"> • <u>Surface</u>: 2.0 inches of Asphalt Concrete Surface Course SM-9.5D • <u>Intermediate</u>: minimum 2.0 inches of Asphalt Concrete Intermediate Course IM-19.0A • <u>Base</u>: minimum 8.0 inches of Asphalt Concrete Base Course BM-25.0A • <u>Subbase</u>: 6.0 inches of Aggregate Base Material, Type 1, Size No. 21B connected to a standard UD-4 edgedrain located beneath the outer edge of the paved shoulder 	<ul style="list-style-type: none"> • No less than 25 feet from the end of full depth pavement reconstruction, the existing pavement shall be milled and overlaid to the following depths and materials up to the nearest longitudinal lane divide: <ul style="list-style-type: none"> ○ <u>Milling Existing Pavement</u>: minimum 2.0 inches ○ <u>Surface</u>: 2.0 inches of Asphalt Concrete Surface Course SM-9.5D 	<ul style="list-style-type: none"> • <u>Surface</u>: 2.0 inches of Asphalt Concrete Surface Course SM-9.5D • <u>Intermediate</u>: minimum 2.0 inches of Asphalt Concrete Intermediate Course IM-19.0A • <u>Base</u>: minimum 8.0 inches of Asphalt Concrete Base Course BM-25.0A • <u>Subbase</u>: 6.0 inches of Aggregate Base Material, Type 1, Size No. 21B connected to a standard UD-4 edgedrain located beneath the outer edge of the paved shoulder

- E. The Concessionaire shall add the following note to the typical section sheets in the construction plans: “The VDOT District Materials Engineer shall be notified within 24 hours of exposing the existing concrete, and at least 48 hours prior to placement of widening pavement, to allow for verification of the exposed edge of pavement.”
- F. Pavement design and construction shall meet the requirements of the federal pavement policy, 23 CFR 626 (Chapter 1).

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- G. The minimum pavement sections are based upon the following requirements:
1. a minimum soil CBR value of 5 within 3 feet of subgrade (therefore all imported fill material shall have a minimum CBR value of 5),
 2. all subgrade is compacted in accordance with the applicable sections of the Road and Bridge specifications and applicable special provisions and,
 3. all unsuitable materials have been removed or modified in accordance with Section 3.5.13.
- H. Pavements shall be designed to ensure positive drainage on the pavement surface and within the pavement structure, including connecting to existing or any new sub-drainage systems. Pavement drainage layers between adjacent pavement sections must consist of similar material and permeability. Drainage layers shall extend continuously across travel lanes and shoulders, connect to appropriate sub-drainage systems, and accommodate pavement drainage from existing or adjacent pavement.
1. Standard UD-4 edgedrains shall be required for all pavements on this project. Modified UD-1 underdrains shall be installed, in lieu of standard UD-4 edgedrain for pavement sub-drainage, in wet areas, areas of high groundwater, springs, and in cuts greater than 25 feet. The modification consists of wrapping the aggregate with geotextile drainage fabric.
 2. Standard Combination Underdrain (CD-1) shall be provided at the lower end of cuts.
 3. Standard Combination Underdrain (CD-2) shall be provided at grade sags, bridge approaches, and at the lower end of undercut areas.
- I. Any pavement reconstruction on arterials, local streets, or interchange ramps not specifically noted above shall be designed to meet the design-year traffic and match the existing pavement type at tie-in in accordance with standard WP-2 and in accordance with the Department's pavement design standards and guidelines.
- J. Approach slabs for all bridges shall be full width – from face to face of barrier/parapet (including extending under sidewalks and shared-use paths).
- K. Concessionaire's plans, typical sections, profiles and cross-sections shall include the appropriate elements identified as a result of the drainage analysis/design and the pavement design. This shall include, but is not limited to, underdrains, stormwater inlets and pipes, and pavement sections reflecting the elements identified in the Concessionaire's final pavement design.

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- L. The area surrounding pavements shall be graded to direct surface water away from paved areas. Any utility excavations or excavations for storm drains within pavement areas shall be backfilled with compacted structural fill in accordance with applicable sections of the Road and Bridge Specifications and applicable special provisions.
- M. The Concessionaire shall submit to the Department for its review, 30 days before the submission of associated final Design Documentation, a pavement design report that documents the assumptions, considerations, and decisions contributing to the Concessionaire's proposed pavement design, including the following:
 - 1. pavement design details by location, including structural layer materials, general specifications, and thicknesses;
 - 2. relevant pavement evaluation data (structural and functional) and condition information on adjacent roads;
 - 3. relevant geotechnical data and drainage information to verify the pavement design(s);
 - 4. design criteria used in determining the pavement design(s), including annual average daily traffic, percentage heavy vehicles, cumulative traffic loading, pavement material strength factors, and pavement design life; and
 - 5. design calculations documenting the pavement design(s) in accordance with the specified design methodology.
 - 6. a minimum soil CBR value of 5 within 3 feet of subgrade (therefore all imported fill material shall have a minimum CBR value of 5),
 - 7. all subgrade is compacted in accordance with the applicable sections of the Road and Bridge specifications and applicable special provisions and,
 - 8. all unsuitable materials have been removed or modified in accordance with the requirements of the the Concessionaire's final roadway plans and specifications and the geotechnical engineering reports.

3.8.2 Temporary Pavement

- A. The Concessionaire shall be responsible for any temporary pavement design and construction. Temporary pavements shall be designed in accordance with the AASHTO Guide for the Design of Pavement Structures (1993 edition) and the VDOT Materials Division's Manual of Instructions. All temporary pavement designs shall be submitted to the Department for review and approval. All temporary pavement designs for interstate mainline or ramp

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pavements shall have a minimum 6 inches of asphalt concrete and shall meet the following minimum design criteria:

- Design Life – 6 months minimum or such longer duration as may be required per the Concessionaire’s construction sequencing
 - Reliability – eighty-five percent (85%) minimum
 - Initial Serviceability – 4.2 minimum
 - Terminal Serviceability – 2.8 minimum
 - Standard Deviation – 0.49 minimum
 - CBR value for subgrade soils determined through laboratory tests.
- B. Temporary pavement shall be required for all locations where the Concessionaire will shift traffic onto an existing shoulder. If the existing shoulder is currently paved, the pavement must either meet or be modified to meet the requirements in Section 3.8.2.A.
- C. Temporary pavement that is installed to strengthen the existing shoulder pavement to meet the requirements of Section 3.8.2.A. shall remain in place once the Work is complete. Temporary pavement that is installed outside the limits of the existing shoulder pavement shall be completely removed once it is no longer in service.
- D. The Concessionaire shall be responsible for maintenance of all temporary pavements and temporary pavement markings.
- E. Any paved shoulder areas used for temporary traffic shall be restored after any such temporary use for the Project has concluded. This restoration work must include the milling of two inches of existing asphalt and placement of a new two-inch asphalt concrete surface course (SM-12.5E) overlay, and the installation of rumble strips, pavement markings and/or raised markers in accordance with VDOT requirements.

3.9 Traffic Engineering

3.9.1 General

- A. The Concessionaire shall provide plans for all traffic control devices with its Design Documentation. Transitions from new markings, markers, and delineators to existing shall be planned such that road users will discern only a minimum change in delineation concept. Design Documentation for the Department’s review and approval for traffic control devices shall be submitted as a complete package for each construction segment. All new and existing traffic control devices within the Opitz Project limits and those signs outside the Opitz Project limits shall be installed modified or replaced in accordance with the standards and specifications set forth in Attachment 1.5a.

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- B. All traffic control devices shall be designed and installed to comply with the standards and specifications set forth in Attachment 1.5a and the requirements of the maintaining agency.
- C. The Concessionaire shall be responsible for the design and construction of the Opitz Project signing, pavement markings, pavement markers, delineators, roadway and sign lighting, and traffic signals. Traffic control devices shall include:
 - 1. all signs, signals, pavement markings, pavement markers, roadway and interchange lighting, overhead signs and delineators necessary within the Opitz Project limits; and
 - 2. signs, mounting structures, and associated lighting outside the Opitz Project limits that are necessary to orderly lead, guide, and regulate traffic to the Opitz Project.

3.9.2 Pavement Markings

- A. The Concessionaire shall provide and maintain pavement markings and reflective pavement markers meeting the applicable standards and specifications set forth in Attachment 1.5a.
- B. On any pavement reconstruction undertaken by the Concessionaire, the Concessionaire shall tie in and match the existing permanent pavement marking systems.
- C. Temporary pavement markings and striping shall not be placed on the final surface course unless approved by the Department.
- D. All existing pavement markings and markers that do not conform to the final traffic patterns shall be eradicated and removed in accordance with the applicable standards and specifications in Attachment 1.5a.
- E. Permanent pavement markings (lane division lines, edge lines, ramp and gore markings) on the 95 Express Lanes and ramps and the I-95 General Purpose lanes and ramps shall be Type B, Class VI, patterned pre-formed tape. All other pavement markings shall conform to the Road and Bridge Specifications.
- F. Purple E-Z Pass Logos shall be installed at the locations shown on the Opitz Design Plans.
- G. High-Contrast Pavement Markings shall be used on all bridge decks and concrete pavements.
- H. The use of thermoplastic pavement markings and pavement marking tape shall conform to the applicable standards and specifications in Attachment 1.5a.

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- I. Channelizing posts used in the Emergency crossovers shall match existing channelizing posts on 95 Express Lanes and be yellow in color for reversible and opposing movement.
- J. Metal casing inlaid pavement markers shall not be used. Any existing metal casing inlaid pavement markers shall be removed and replaced when any lane shifts are implemented for construction sequencing or maintenance of traffic. New or replacement plastic inlaid markers shall meet the requirements of the Road and Bridge Standards PM-8 and other applicable standards and specifications set forth in Attachment 1.5a.

3.9.3 Static Signs

- A. The Concessionaire shall design, fabricate, and install all new guide, supplemental, route marker, trail blazer, regulatory and warning signs required for this Opitz Project to meet standards and specifications set forth in Attachment 1.5a. The Concessionaire shall also modify or remove any signage, including associated structure, foundation and lighting, outside of the limits of the Opitz Project that is no longer appropriate or pertinent to the Opitz Project.
- B. The Concessionaire shall prepare and present signing roll plans for review and comment by the Department. The signing roll plans will be used for reviewing the dynamic messaging and static signs on the I-95 corridor and connecting roadways to include proposed sign locations and messages for all guide signs and HOT lane signs applications, and for reviewing existing and proposed static signs (trail blazers and route market assemblies) on highways, feeder roadways and other roadways directing and notifying motorists of the access to the Opitz Project.
 - 1. The signing roll plans shall show proposed locations for relocating existing signs, and proposed locations for existing and new structures.
 - 2. The signing roll plans shall also display signing, both existing (to remain) and proposed, for all mainlines, ramps and interchanges, as well as for the arterial streets, frontage roads, and any other roadways that contain signing that is affected by the Opitz Project.
 - 3. The signing roll plans shall also include the locations of all proposed and existing Dynamic Message Signs. The signing roll plan features shall include but are not limited to, the existing and proposed roadway alignments, right-of-way, baseline of construction (including stationing), and existing topography at the tie-in points of the roadway limits of work. The proposed pavement markings may also be shown on the signing roll plans.
 - 4. The signing roll plans shall show all existing and proposed highways and feeders with all existing and proposed trail blazers and router

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marker assemblies to I-95 and Opitz Express Lanes for at least one mile from the nearest Express Lanes entrance point or to the extent of the existing I-95 routing signs. New Express Lanes trailblazers should be co-located with existing I-95 trailblazers to the extent possible. All trail blazing signs (Express Lanes and GP Lanes) shall be of the same size.

- C. Existing fixed sign panels can be re-used or relocated if they are demonstrated to be in good condition with no damage or deterioration and in accordance with the requirements of Attachment 1.5a.
- D. The Opitz Express Lanes signage scheme will:
 - 1. support the integration of the Opitz Express Lanes with the existing road network;
 - 2. facilitate navigation of the road network, including access to, travel along and egress from the Opitz Express Lanes; and
 - 3. be consistent with the existing directional and regulatory signing system on the existing road network and the 95 Express Lanes.
- E. The types of signage that constitutes Opitz Project signage include:
 - 1. regulatory, guide, and warning signs
 - 2. advance direction signs
 - 3. intersection direction signs
 - 4. trailblazer signs
 - 5. advance exit signs
 - 6. exit direction signs
 - 7. advance and/or confirmation signs (static and dynamic)
 - 8. rules of use permission signs
- F. All new full span sign structures and foundations shall be designed to accommodate an additional static sign load of 200 sq. ft. for future use. All cantilever and butterfly sign structures and foundations shall be designed to accommodate an additional static sign load of either 50 sq. ft., or a 25% increase in the sign panel area shown in the Opitz Design Plans, whichever is greater, for future use.
- G. The Concessionaire shall relocate all signs within the construction limits that conflict with construction work. Signs that are not needed for the safe and

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orderly control of traffic during construction may be removed and stored in a manner that will preclude damage and reinstalled in their permanent locations prior to Final Completion.

- H. No overhead sign structures shall be bridge-mounted or parapet-mounted. Sign structures built into the bridge to support signs to be viewed by traffic traveling over the bridge shall be permitted.
- I. The Concessionaire shall be responsible for coordination with the Department or the pertinent local agencies or jurisdictions in order to install directional signage, including, without limitation, obtaining all applicable Regulatory Approval.
- J. The Concessionaire shall provide the necessary guide, warning and regulatory signs for the Opitz Project.
- K. The Concessionaire shall maintain all existing signs during construction, unless they are to be removed permanently or have been replaced as required by the Opitz Project. For any existing signs that require relocation due to construction, the Concessionaire shall present pertinent details, such as sign designs, mounting details, locations, and existing condition, for the Department's review and comment, prior to relocation.
- L. The Concessionaire shall modify or remove existing signs and structures that are rendered inaccurate, ineffective, confusing or unnecessary. Where sign panels are replaced or added to existing sign structures, vertical strut lengths will be designed or modified as needed to not extend beyond the limits of the new sign panels. The Concessionaire shall obtain the Department's approval prior to making any such changes.
- M. The Concessionaire shall identify and provide a summary of all existing signage impacted by the Opitz Project, including signs and associated sign structures that are outside the physical limits of roadway construction. For modifications (including adding, deleting or modifying sign panels) to any existing overhead/cantilever sign structure affected by the Opitz Project, the Concessionaire shall provide a comprehensive structural analysis for the Department's review and written comment prior to the commencement of design in accordance with the requirements of Section 3.15.3. To assist with the structural analysis, the Department will provide (if available) existing structural information, shop drawings, and foundation calculations to the Concessionaire for each existing sign structure identified by the Concessionaire.
- N. The Department will review the structural analysis provided by the Concessionaire for each sign structure to determine whether or not the existing structure and/or sign can be modified as proposed. If it is determined that modifications to the existing sign structure and/or signs are not structurally acceptable, the Concessionaire shall provide new signs and structures, in

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accordance with Attachment 1.5a, to replace the existing sign structures and signs.

- O. Sign lighting conditions shall conform with the Department's standard lighting requirements for freeway operations and shall be subject to the Department's approval. Signs shall incorporate highly reflective sheeting material to optimize lighting installation. The Concessionaire shall perform an Overhead Sign Lighting Study in conformance with IIM-TE-380 (Overhead Sign Lighting) to determine which, if any, overhead signs require lighting. Overhead and ground-mounted signs which do not require lighting must use Type XI reflective sheeting. The same sign lighting design shall be applied throughout the Opitz Project for both existing and new signs. The Concessionaire shall provide the Overhead Sign Lighting Study to the Department for review and approval prior to final design. Luminaire retrieval systems will not be required for luminaires that are maintained by the Concessionaire.
- P. Post Interchange Signs (as defined in MUTCD Section 2E.38) shall be installed on the Opitz Project in accordance with applicable standards where space and/or permanent structures permit.
- Q. The Concessionaire shall place milepost and intermediate markers at 0.2 mile intervals facing northbound on the right side of the roadway on the reversible lanes and facing southbound on the left side of the roadway.
- R. The mile markers shall conform to MUTCD Figure 2H-2, Reference Location Signs, and intermediate markers shall conform to MUTCD Figure 2H-3, Intermediate Reference Location Signs.
- S. For signing along I-95, all guide signs, dynamic message signs and supplemental guide signs on overhead structures shall be installed such that 800 foot minimum spacing is maintained between signs. In areas where the 800 foot minimum spacing cannot be maintained the Concessionaire shall obtain approval from the Department to reduce the spacing.
- T. The limits of directional and Opitz Express Lanes signage, for the Opitz Project for which the Concessionaire is responsible, shall extend to provide sufficient information to users of the Opitz Express Lanes for direction and access purposes to all entry and exit points.
- U. The Concessionaire shall perform line of sight analysis for all sign structures as necessary to confirm drivers have sufficient time to read the sign messages, and signs are not visually obstructed.
- V. The Concessionaire shall provide accurate and detailed elevations for all sign structures, including all dimensions, existing physical features and proposed constructed features to confirm physical locations and orientation.

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- W. Clearview font will be permitted on new or modified signs in conformance with IIM-TE-337 (Clearview Highway Font Lettering for Guide Signs).
- X. The Concessionaire shall prepare and submit for approval a Sign Sequencing Plan and a Sign Unveiling Plan. The Sign Sequencing Plan shall be coordinated with and included in the Opitz Project TMP, as defined in Section 1.9.3 of these Technical Requirements. The Sign Unveiling Plan shall be coordinated with the events of, and included in the Opitz Project TMP and the opening schedule of the completed lanes. Both plans shall be approved by the Department prior to implementation. These plans shall provide a detailed sequence for covering and removing the existing signs and unveiling the covered existing and completed proposed signs. The Sign Sequencing Plan shall be focused on signs during construction activities while the Sign Unveiling Plan shall be focused on opening the completed lanes to traffic. The Department will coordinate with the Concessionaire to provide a permitted timeframe to implement these plans. The Sign Unveiling Plan shall be finalized no later than sixty (60) days prior to Service Commencement.
- Y. The use of purple backgrounds shall be as depicted in the Opitz Express Lanes signing concept as provided in the Opitz Opitz Design Plans. The Concessionaire is responsible for getting approval from FHWA for any deviations from the Opitz Design Plans. The Department will facilitate coordination with FHWA and support the Concessionaire in obtaining such approval.

3.9.4 Traffic Signals

- A. The Concessionaire shall design, supply and install all necessary temporary and permanent traffic signals and related infrastructure for the Opitz Project as provided by this section and the standards and specifications set forth in Attachment 1.5a.
- B. The Concessionaire shall design the Opitz Project to include new traffic signal installations and modifications to existing traffic signal installations meeting the design requirements of the maintaining agency. The Department shall provide reasonable assistance to the Concessionaire in obtaining the relevant design requirements from any maintaining agency.
- C. The Concessionaire shall provide communications between all temporary and permanent traffic signals for the Opitz Project and the maintaining agency's traffic signal system. The communications medium shall be broadband and compatible with the maintaining agency's communication system or plan. The broadband connection from the service provider shall be hard wired.
- D. New traffic signals on the Opitz Project will be integrated with existing traffic signals using the following approach:

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1. The Concessionaire shall design, program, adjust controller timings, test, and commission the new signalized intersection(s) and existing impacted or modified signalized intersection(s) for coordinated operations matching the maintaining agency's existing coordination plans. If incorporation of the new signal is not compatible with existing signal coordination plans, the Concessionaire shall provide timing plans for optimization of existing signal coordination plans in coordination with the Department.
 2. The Department or the maintaining agency will test and commission any existing signalized intersection(s) that are not impacted by the Concessionaire for the Opitz Project for network operations with the existing traffic signal system(s) in accordance with the updated signal coordination plans and will re-time network signals, as needed, to accommodate network demand.
 3. The Department or maintaining agency will be responsible for optimizing traffic signal timing at intersections with Opitz Project entry and exit ramps and approaching roadways to ensure that traffic does not normally produce queues that create a safety hazard on either the Opitz Project or the approaching roadways.
- E. The Concessionaire shall keep the existing signalized intersections within the Rights of Way functional during the Work period. If signals must be shut down, the Concessionaire shall provide temporary signals or appropriate traffic controls. Temporary signal shut down without replacement shall not be permitted.
- F. For any temporary traffic control phase that impacts existing traffic signals, the Concessionaire shall develop signal timing plans for the Opitz Project and roadways designated as detours and submit the plans to the Department. The Concessionaire shall implement, test, and adjust signal timings to prevailing conditions. The Concessionaire shall develop signal timing plans for all peak and non-peak periods which may require more than eight (8) plans.
- G. The Concessionaire shall install and be responsible for all aspects of temporary and permanent traffic signal installation to include but not be limited to design, obtaining permits, installation, rehabilitation of disturbed areas, and acquiring dedicated SE-5 metered electric service power and hard wired broadband communication connections.
- H. The Concessionaire shall install and connect dedicated SE-5 metered electric service power service for temporary and permanent traffic signals for the Opitz Project.
- I. Conductor/communication cables shall be placed in buried conduit, embedded conduit, and structure and bridge-mounted conduit.

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- J. The Concessionaire shall not open trench any existing pavement for the installation of conduit, except in areas that will be overlaid or rebuilt. For overlays over trench areas, the new pavement section shall match the existing pavement section.

3.9.5 Roadway Lighting

- A. Roadway lighting shall conform to this section and the Standards and Specifications set forth in Attachment 1.5a.
- B. The Concessionaire shall install Partial Interchange Lighting for new or modified entry and exit connections to the Express Lanes. The Concessionaire shall complete a lighting analyses for these locations in accordance with IIM-TE-390. Continuous roadway lighting is not required for the Opitz Project.
- C. The Concessionaire shall design and construct any permanent roadway lighting such that the lighting systems for the General Purpose lanes and the Express Lanes are separately operated and maintained by VDOT and the Concessionaire, respectively, unless otherwise approved.
- D. Temporary and permanent lighting facilities for the project shall be installed to ensure lighting facilities meet current Department Lighting Design Standards and Guidelines (found in Chapter 2 of the VDOT Traffic Engineering Design Manual) and ANSI/IESNA RP-8 requirements.
- E. Light Emitting Diode (LED) luminaires shall be used for all new lighting.
- F. All lighting design shall:
 - 1. Be prepared in accordance with the USDOT Roadway Lighting Handbook; VDOT Road and Bridge Specifications; Illuminating Engineering Society of North America Recommended Practices (RP-8-18); AASHTO Roadway Lighting Design Guide and the VDOT *Special Provision for Light Emitting Diode (LED) Luminaires*.
 - 2. Include point-to-point lighting analysis and calculations performed using AGI-32 computer software; and
 - 3. Use fixtures with required Backlight-Uplight-Glare (BUG) rating.
- G. The Concessionaire shall preserve all existing lighting assets along the I-95 Corridor throughout the Construction Period in order to avoid a diminution of the existing lighting conditions for a period of more than thirty (30) days unless otherwise approved by the Department. If the necessary repair or replacement of an existing lighting asset cannot be completed within the 30 day period, the Concessionaire shall provide, prior to the expiration of the 30 day period, temporary lighting equipment until the completion of the repair or replacement Work.

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- H. The Concessionaire shall install new or replacement roadway lighting as necessary to provide equal or better lighting conditions for any existing permanent roadway lighting that is impacted by the Concessionaire's Work. Such lighting shall conform to the requirements of this section and the Standards and Specifications set forth in Attachment 1.5a.

3.9.6 Power

- A. The Concessionaire shall design, install, and connect electrical power service to sustain all operations for the ETTM system, including all other facilities required for the Opitz Project.
- B. Junction boxes shall not be combined for Concessionaire and Department power facilities.
- C. The Concessionaire shall be responsible for new utility service connections, including full coordination with the utility owners and payment of connection fees. The Concessionaire shall be responsible for paying the monthly utility bills associated with new service panels, up to and including the date of Service Commencement. The Concessionaire is responsible to perform or cause to be performed the design, supply, and installation of all new power feeds (from service panel to power source) necessary or feed modifications requiring service upgrade from the electric utility company as part of the Work.
- D. The Concessionaire shall install and have connected dedicated metered SE-5 power service for new or relocated traffic signals and separate dedicated metered power service compliant with the standards and specifications set forth in Attachment 1.5a and the requirements of the maintaining agency for lighting (sign, roadway, and interchange) for the Opitz Project.
- E. The Concessionaire shall provide back-up electrical power service to support Operations and Maintenance Work in Emergency situations where the primary power source is not available, where practical.
- F. The power supply for the ETTM Equipment shall be metered independent from any non-ETTM Equipment. The power supply for any Opitz Project equipment (including lighting) shall be metered independent from any Department power supply. The power supplies for all (both Concessionaire and Department owned) existing roadside equipment and infrastructure must remain in service at all times.
- G. Where approved by the Department, and consistent with 3.9.6.F above, new Opitz Express Lanes lighting, ITS and TMS roadside equipment may be connected to existing Department electrical service panel frames if separately metered and controlled.
- H. The Concessionaire shall provide back-up power (generators and UPS) for the operations of the gate systems which includes the reversible gates, the pricing

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confirmation DMS signs, CCTV cameras, and other ETTM Equipment if part of the gate system.

1. Generator sizing shall be determined by the Concessionaire based on the projected equipment loading.
 2. Propane fuel supply lines between the generators and the fuel storage tank shall be above ground.
- I. The Concessionaire shall provide an uninterruptible power supply (UPS) back-up power for the operations of all gate systems' DMS, which includes the pricing confirmation DMS signs and all parts of the gate system. For traffic signals, the Concessionaire shall provide an uninterruptible power supply (UPS) back-up power with external portable generator port in accordance with the VDOT Road and Bridge Specifications.
- J. Vehicle access shall be provided at each generator site for refueling. Such access shall accommodate safe ingress/egress for a typical refueling vehicle.
- K. Phase taping of electrical conductors shall not be permitted. Electrical conductors shall have a continuous colored jacket between connection and termination points.
- L. Power infrastructure shall not share conduit or junction boxes with communications infrastructure.
- M. The minimum size of electrical junction boxes for lighting power shall be JB-S2 or JB-R2.

3.10 Fences and Barriers

- A. The Concessionaire shall be responsible for securing the Work and providing all temporary fencing necessary to ensure the safety of the work force and members of the public.
- B. The Concessionaire shall perform a safety risk analysis to determine whether fencing should be used to separate the noise barrier wall erection work zones from adjacent properties and, if such analysis shows that fencing is required, the Concessionaire shall provide temporary six-foot-high (minimum) chain link security fencing at any such locations.
- C. Fencing on bridges and abutments, where applicable shall be black, vinyl coated, ClearVu, Beta, BearGrille mesh or equivalent. Standard Details for fencing shall be modified as necessary to accommodate light poles and signage. All fences and handrails shall be grounded in accordance with VDOT Road and Bridge Standards, and VDOT Road and Bridge Specifications,

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Sections 410, 504, and 507. The proposed fence and railing shall be grounded according to the National Electric Code (NEC).

- D. Fencing surrounding all generator sites shall include screening that is a minimum 6 ft tall industrial type fence, chain link fence, or equivalent protection with privacy screening material consisting of vinyl slats. The open area within the generator site fencing shall be covered with six (6) inches of compacted gravel (Aggregate Base Material Type 1, Size 21) and a four (4) inch concrete slab to provide a level surface for installation of equipment and fuel tank.

3.11 Aesthetics

- A. Structural elements for the Opitz Project shall be designed and constructed to be visually consistent with the nearby vicinity of the I-95 corridor and, where applicable, compatible with any specific third-party requirements.
- B. Where existing structural elements that are to be incorporated into the Opitz Project have aesthetic treatments, the surface finish for new and adjacent elements (for noise barriers, retaining walls, bridge parapets and walls, and bridge abutments, etc.) shall match existing to the maximum extent practicable. Where these existing structural elements currently have no architectural or aesthetic treatments, such new and adjacent elements shall receive a smooth concrete finish. The existing and new structural elements in these cases shall be stained to match AMS Standard 595-36492 Gray.
- C. The Concessionaire shall coordinate with Prince William County to obtain feedback about aesthetic treatments that may be incorporated into specific project features.

3.12 Landscaping

- A. If determined by the Department to be required, landscaping will be handled as a Department Change, without any time extensions. This shall include design and installation of plant material, sodding, associated watering, necessary maintenance, a guaranteed 2 year post-Final Completion establishment period, and other associated costs to complete the landscaping work.
- B. The landscaping species and locations will be finalized with the Department's input. The Concessionaire shall complete the landscaping plans within 60 days, once the final noise walls study, design and are approved by the Department.
- C. A Department Change authorizing the initial design efforts shall be issued in a timely manner.

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- D. Any Department Change subject to Section 3.12 will be issued before 365 days from Final Completion Date.
- E. The Department Changes for landscaping will generally be limited to reforestation and enhancement of area disturbed during construction.
- F. Stabilization of disturbed areas of the project to maintain permit conditions shall not be included in the Department Change for landscaping and shall be the Concessionaire's responsibility.
- G. The Concessionaire shall provide landscaping as required to mitigate Project impacts to the community.
- H. Landscape plans shall be prepared by a Virginia Licensed Landscape Architect and shall be submitted to the Department for review and approval. The plans shall be prepared in a format consistent with the Department's standards for roadway plans.
- I. The Concessionaire shall assume that adequate locations will be identified within the proposed Right Of Way.
- J. Progress payments will be made monthly by the Department in accordance with the Agreement.

3.13 Not Used

3.14 Bicycle and Pedestrian Facilities

- A. The Concessionaire shall design and construct the Opitz Project to include reconstruction of any disturbed pedestrian and bicycle facilities in accordance with IIM-TMPD-1.0 *Bicycle and Pedestrian Accommodations* and the latest version of the *Manual on Uniform Traffic Control Devices (MUTCD)*.
- B. All existing pedestrian and bicycle facilities shall be maintained throughout construction until permanent facilities can be fully opened. Any temporary pedestrian or bicycle facility closure request shall be submitted in writing to the Department for review and comment.
- C. All new facilities and modifications to existing facilities will be designed in accordance with the standards and specifications set forth in Attachment 1.5a.
- D. The Concessionaire shall conduct coordination meetings with all local jurisdictions and the Department to ensure all existing and planned pedestrian and bicycle facilities are identified within the Opitz Project limits.
- E. If bicycle or pedestrian facilities are identified (either existing or proposed), the Concessionaire shall coordinate with the Department's District Bicycle

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Pedestrian Coordinator and local jurisdictions on the design, temporary traffic control and construction staging of the bicycle and pedestrian facilities within the project limits.

- F. Pedestrian signals shall be accessible pedestrian signals. All pedestrian signal displays shall be countdown signals.
- G. Pedestrian pushbuttons shall be a minimum of 2 in. across in one dimension and shall contrast visually with the housing or mounting.
- H. Pavement designs for sidewalks and paths shall include a minimum four inch layer of Aggregate Base Material Type 1, Size 21 B, or comply with site and subsurface conditions, whichever is greater.

3.15 Structures and Bridges

3.15.1 Bridges and Culverts

A. General Requirements

1. All new bridges, bridge replacements, widening and/or modifications of existing bridges (including any geometric changes to roadways on and underneath the existing bridge), repair of existing bridges, new culverts and retaining walls, and modifications to existing culverts and retaining walls shall be designed in accordance with AASHTO LRFD Bridge Design Specifications including its Errata (“AASHTO LRFD”) and all current revisions and VDOT modifications (*IIM-S&B-80 VDOT Modifications to AASHTO LRFD Bridge Design Specifications*) issued as of the issuance date of the RFP. All other structures shall be designed to the appropriate design Standards and Specifications set forth in Attachment 1.5a.
2. The Concessionaire shall comply with VDOT’s Manual for the Structure and Bridge Division.
3. Infinite life fatigue requirements shall apply to all bridges.
4. Under no circumstance shall the minimum vertical clearance for proposed structural elements be less than 16 feet 6 inches over existing and proposed roadways and streets carrying vehicular traffic, unless an applicable Design Exception or Design Waiver is approved.
5. The Concessionaire shall use Concrete Low Shrinkage Class A4 Modified, for all bridge decks and Concrete Low Shrinkage Class A4 Modified (lightweight) for bridge parapets/railings, bridge sidewalks, and bridge medians.

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6. Post-tensioning of any type shall not be allowed (with or without grout or ducts).
7. High Performance Steel Grade HPS 100W shall not be allowed.
8. High Performance Steel Grade HPS 70W shall only be allowed with an approved Design Waiver.
9. Furnishing and placing hydraulic cement concrete for concrete elements whose minimum dimensions exceed five (5) feet shall be performed in accordance with the *Special Provision for Hydraulic Cement Concrete for Massive Construction*. Regardless of minimum concrete element dimensions, the maximum allowable thermal gradient between the core and skin temperature of a concrete pour is limited to 35° Fahrenheit and the maximum allowable temperature in any portion of the concrete pour shall be 170° Fahrenheit for slag and cement mixes and 160° Fahrenheit for fly ash and cement mixes. For concrete elements where the minimum dimension is five (5) feet or less, and where the potential for exceeding the maximum allowable thermal gradient and maximum allowable temperature limits above may exist, it shall be the Concessionaire's responsibility to determine if the *Special Provision Hydraulic Cement Concrete for Massive Construction* should be used for furnishing and placing the hydraulic cement concrete for such elements.

B. Details and Drawings

1. All details and drawings should be in accordance with the VDOT Manual of the Structure and Bridge Division. Should any such details not be applicable, Concessionaire shall implement a modified version of the requirement such that it is in compliance with AASHTO LRFD.
2. Details and drawings not specifically included in the Manual of the Structure and Bridge Division may only be included in the structural plans and working drawings after review and approval. Should any such details not be acceptable, the Concessionaire shall make the necessary modifications or shall submit an alternate detail that is acceptable.
3. Any new bridge, replacement bridge or repairs, and modifications to existing bridges or structures (including any geometric changes to roadways on or underneath the existing bridge) shall be designed, detailed, and submitted as a plan package for review and approval. A preliminary type, size and location plan, including all proposed stages of construction (as applicable), shall be submitted for Stage I review and approval prior to proceeding with final design.

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C. Superstructure

1. Bridge type and layout shall be based on reducing long-term maintenance costs. The use of continuous span units and jointless bridge design technologies shall be used as outlined in the VDOT Manual of the Structure and Bridge Division, Part 2 Chapter 17. The Virginia Abutment details shall be developed as shown in VDOT Manual of the Structure and Bridge Division.
2. VDOT standard parapets and rails shall be used.
3. All bridges with pedestrian and/or bicycle facilities shall include CPSR railing in accordance with VDOT Structure and Bridge Manual.
4. VDOT standard pedestrian fences for all applicable structures shall be vertical fencing with curved top. All fence elements shall meet the requirements of Section 3.10.
5. No timber bridge elements of any kind will be acceptable in proposed structures.
6. Either prestressed concrete or structural steel beams and girders may be used.
7. The use of asphalt overlays on concrete bridge decks shall not be permitted.
8. All connections of ramp bridges to intersecting overpass structures shall be made without the introduction of joint at the interface between the ramp bridge and the overpass. The connection at the intersection between the two structures, shall be designed either as a moment connection or, if a moment connection is impractical, a shear connection with a link slab (see Manual of the Structure and Bridge Division Part 2 file 32.09-2 for a typical detail of a link slab).
9. The use of prestressed deck panels as stay-in-place forms for proposed deck widening shall not be permitted.
10. Use of fracture critical elements is not permitted. The use of integral pier caps is not permitted.
11. The Concessionaire shall submit girder erection plans, procedures and calculations in accordance with the applicable Standards and Specifications set forth in Attachment 1.5a.

D. Substructure

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1. The Concessionaire shall ensure that all recommendations related to the suitability of foundation material for spread footings at the time of construction are confirmed in the field by the Geotechnical Engineer registered and licensed by the Commonwealth of Virginia. Foundation recommendations for the proposed bridge shall be submitted for review with the submittal of final foundation construction plans.
2. Piers used for all bridges shall be limited to the following types: hammerhead piers with rectangular columns, multi-column piers with square or circular columns, and wall piers.
3. Substructures shall be self-supporting under all service life conditions, including superstructure replacement. Superstructure shall not participate in the stability or strength of the substructure.

E. Existing Bridges

1. General Requirements

- a. The Concessionaire is required to submit plans for the modification of an existing structure that are consistent with applicable Standards and Specifications set forth in Attachment 1.5a. Plan sets are also required to show all changes, including but not limited to vertical and horizontal clearances, lane configurations on and beneath the bridge, addition of bridge conduit systems, and other modifications.
- b. All modifications to existing bridges, including complete or partial removal of a bridge, shall be staged as necessary to maintain travel lanes for the duration of construction and in accordance with these Technical Requirements.
- c. It is the Concessionaire's responsibility to obtain and verify any required as-built field details and dimensions needed for any purpose, including but not limited to modifying or dismantling any existing bridge.
- d. To obtain copies of Bridge Safety Inspection Reports, the Concessionaire must complete a CII/SSI Non-Disclosure Agreement as outlined in IIM- S&B-71 Critical Infrastructure Information (CII)/Sensitive Security Information (SSI).
- e. Barrier protection of structures shall satisfy the requirements of AASHTO LRFD, including the

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requirements of article 3.6.5 and the requirements of the Manual of Structure and Bridge Division Part 2, Chapter 15. Existing bridge piers, shall be protected by a standard VDOT Bridge Pier Protection System (BPPS series). The standard BPPS series barriers shall be designed and detailed in accordance with the VDOT Manual of Structure and Bridge Division. If Bridge Pier Protection System is not provided for substructure units with 30 feet of the edge of roadway, the substructure unit shall be designed for collision forces in accordance to AASHTO LRFD and VDOT S&B Manual.

- f. Existing bridge spans shall be widened with the same beam type and same material (e.g., steel or concrete).

2. Scope of Work for Bridges to Remain in Place

The scope of work for repair of bridges to remain in place or to be widened shall include the following:

- a. Inspection and evaluation of bridge deck shall be limited to delineating delaminated concrete for removal prior to placement of new patching or overlay, if required.
- b. Inspection and evaluation of substructure shall be limited to delineating delaminated and spalled concrete for removal prior to performing substructure repair. Delineated areas shall be expanded 6 inches beyond each side, and top and bottom. Repair of substructure spalls and delaminations shall include providing and installing embedded galvanic anodes in accordance with the VDOT Road and Bridge Specifications. Substructure cracks shall be repaired with Crack Repair Type B (Epoxy injection) in accordance with the VDOT Road and Bridge Specifications.

3. Additional Requirements

- a. Only bearings that are included in the Manual of the Structure and Bridge Division Vol. V Part 3 shall be used in the widened portion of the bridge structure regardless of the superstructure type selected. Installation of new bearings and all necessary work shall be included in the scope of work for any superstructure replacement, and no existing bearing components shall be re-used. The Concessionaire shall ensure that the existing and new bearings are compatible with each other, and will not result in over stressing the existing or new bearings.

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- b. Existing structural approach slabs shall be in accordance with File No. 06.07 of Part 2, of the Manual of the Structure and Bridge Division where the existing bridge is being widened or where the travel lanes are being modified unless otherwise approved.
- c. The location of any deck construction joint shall be over a girder and between shear connectors from the girder to the deck, unless otherwise approved.
- d. Existing bridge elements shall be evaluated to determine effects of bridge widening, joint closures or other modifications for the bridge. Regardless of design method used on the existing bridge, AASHTO LRFD shall be used for the initial evaluation of existing elements. For existing bridges not designed using LRFD and where it is determined that resulting LRFD factored loads are in excess of LRFD factored resistance, the Load Factor Method or Allowable Stress Method in accordance with the AASHTO Standard Specifications for Highway Bridges, 16th Edition, may be used for the evaluation of the existing elements.

4. Dismantling and Removing Existing Structures or Removing Portions of Existing Structures

With any demolition and temporary support over or adjacent to live traffic, the Concessionaire shall submit a plan for review and approval prior to the commencement of any demolition work. The demolition plan shall include, but is not limited to, details of protection of the underlying bridges, roadway, and users. The Concessionaire shall determine the effect of equipment loads on the bridge structure, and develop and submit plans that show the procedures for using the loaded equipment without exceeding the structure's design capacity. The Concessionaire's plans shall be signed and sealed by a Professional Engineer licensed by the Commonwealth of Virginia.

5. Live Load Rating of Modified Bridges

- a. All modifications to existing bridges shall be evaluated for their impacts on the live load rating of the bridge. In addition to the requirements set forth below, modifications to an existing bridge shall not result in the bridge requiring a posting for live load carrying capacity.
- b. If the current HL93 Rating Factor (as computed per the Manual for Bridge Evaluation) is greater than or equal to

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1.0 at the inventory level, then the HL93 inventory rating factor for the modified structure shall be greater than or equal to 1.0.

- c. If the current HL93 Rating Factor (as computed per the Manual for Bridge Evaluation) is less than 1.0 at the inventory level, then the HL93 inventory rating factor for the modified structure shall be greater than or equal to the inventory rating factor for the unmodified subject structure.

F. Bridge Drainage

1. The minimum dimension of pipe used in a drainage system for new bridges and widened portions of existing bridges shall be eight (8) inches.
2. To the extent possible, pipes and downspouts shall be designed to avoid interference with aesthetics of the bridge.
3. The use of ditches and open channels with grades greater than 10% shall not be permitted on slopes directly underneath a bridge or on slopes located within 100 ft. of a bridge structure. An enclosed drainage system shall be used to capture the bridge deck runoff, including runoff from its approach slab, and convey the runoff to the bottom of the slope or into a drainage system.

G. Load Ratings for Bridges

1. Structure load ratings are required and shall be performed in accordance with the requirements of IIM-S&B-86 – *Load Rating and Posting of Structures (Bridges and Culverts)* and the following:
 - a. When a phased portion of a newly constructed structure is intended to carry traffic in a temporary configuration.
 - b. Load rating of any partial configuration of the existing structure.
 - c. A final, as-built, load rating analysis of each new structure reflecting traffic in its final configuration. This load rating should incorporate any as-built changes that may have been made, which in the judgment of the Concessionaire will affect the load rating (e.g., minor changes to stiffener or diaphragm locations may not affect a load rating).
2. No partial or completed structure shall be placed into service if a Load Restriction (Posting) is required based upon the load rating

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analyses. The Concessionaire is responsible for all remedial measures and corrective action required to provide a structure that satisfies the load rating requirement outlined in IIM-S&B-86– *Load Rating and Posting of Structures (Bridges and Culverts)*.

II. Safety and Acceptance Inspection for Bridges

1. Acceptance of the bridge structure will require the following two independent inspections:
2. A satisfactory safety and inventory inspection as described below is required prior to opening the structure or portion of the structure to public traffic. This safety and inventory inspection by VDOT will serve as the initial inspection of the structure. Data gathered will include, at a minimum, location, date completed, alignment, description, horizontal and vertical clearances, structure element description and condition data, and traffic safety features. Such inspections will be required prior to opening any newly constructed portion or phase of the bridge to traffic.
3. A satisfactory final construction inspection by VDOT is required prior to acceptance of the structure. To facilitate inspection of the structure, the Concessionaire shall ensure that all structural elements are accessible and shall provide adequate resources including:
 - a. Man-lifts, bucket trucks, under bridge inspection vehicles, or other equipment necessary to inspect the structure, as well as properly trained staff of sufficient composition to support the inspections; and
 - b. Plans, procedures, personnel, and equipment to implement traffic control measures.
4. The Concessionaire shall provide a minimum of thirty (30) days' notice whenever it requires VDOT to undertake an inspection. The Concessionaire's notice shall include the latest version of the plans (including all field design changes), traffic control procedures, a description of the items to be inspected and an anticipated schedule for the inspections.
5. Unless otherwise approved, structures shall be substantially complete (i.e., roadway, slopes on the approaches, and slopes underneath the structure are already in place) before the final construction inspection will be performed.

I. Plan Submission

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1. The Concessionaire shall make Stage I (Preliminary Plan) submissions and Stage II (Final Plan) Submissions.
 2. Stage I (Preliminary Plan) Submission
 - a. The Concessionaire shall submit a Stage I (Preliminary Plan) submission for each new bridge, bridge replacement, and bridge widening and/or modification.
 - b. Stage I submission must be submitted prior to any final design submittal. Final design prior to approval of the Stage I submission shall be solely at the risk of the Concessionaire.
 - c. The approval of the Stage I submission shall be subject to the approval of the preliminary geotechnical report completed in accordance with the requirements of Section 3.4 Geotechnical, and roadway geometry.
 - d. Stage I submission shall include: Stage I drawings prepared in accordance with the Stage I Plan Review Checklist, Stage I Report, Stage I Report Summary Form, and other preliminary plan requirements indicated in the applicable Standards and Specifications set forth in Attachment 1.5a.
 - e. The Stage I report shall follow the Stage I – Report Template, which shall be provided upon request, except as modified below.
- (i) Section 3.10, Constructability Issues: The Report need not consider constructability issues (except for how it relates to maintenance of traffic; the report shall include a section on maintenance of traffic).
- a. Section 6, “Bridge Preliminary Recommendation” is modified as follows: the report need only describe the single alternative being presented for approval.
 - b. Section 6, the report requirements are extended to specifically address in detail all non-standard items, unique or complex features.
 - c. Section 7, Engineer’s Cost Estimate for each Alternative, is not required.
 - d. Section 8, Schedule, is not required.
 - e. The report will include copies of design exceptions and waivers that influence the design of the structure or roadway approaches,

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both over and under, and shall include a write-up on how the design exceptions and Design Waivers affect the bridge.

3. Stage II (Final Plan) Submission
 - a. The Concessionaire shall submit structure Stage II (Final Plan) submission for each new bridge, modification to an existing bridge, bridge rehabilitation, modification to lane and shoulder configuration on or under an existing bridge and/or culvert, or modifications to culvert structures.
 - b. Final plans may be submitted as completed plan set(s) or in plan submission packages (i.e., foundation plan package, substructure plan package, superstructure plan package, etc.). The final plans are to be submitted according to the submission schedule provided by the Concessionaire.
 - c. The Stage II drawings shall be prepared in accordance with the Stage II Plan Review Checklist.
 - d. Final design calculations and construction drawings shall be signed and sealed in accordance with the VDOT Manual of the Structure and Bridge Division, Part 2, Chapter 1, Section 16: Sealing and Signing of Plans and Documents.
4. Additional Requirements for Bridges

The Concessionaire is responsible for obtaining the VDOT B-number, Federal Identification and plan number for each new bridge included in the Opitz Project. Plan sets should contain sheets that are arranged and detailed as outlined in the Manual of Structure and Bridge Division Part 2.

3.15.2 Retaining Walls

A. General Requirements

1. The retaining walls shall be designed using AASHTO *LRFD Bridge Design Specifications*; including its Errata; VDOT Modifications (IIM S&B-80 *VDOT Modifications to AASHTO LRFD Bridge Design Specifications*); The Manual of Structure and Bridge Division Part 2 Chapter 18 Earth Retaining Walls; and applicable sections of the Road and Bridge Standards, Vol. I & II and as specified in the Technical Requirements. Timber lagging for post and panel walls shall be pressure treated in accordance with the VDOT Road and Bridge Specifications.

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2. If the Concessionaire elects to use mechanically stabilized earth (MSE) walls, the fill material used in the reinforced zone shall be a crushed aggregate with properties in accordance with the VDOT's Special Provisions for approved proprietary MSE walls. The Concessionaire shall provide both global and external stability analysis utilizing an approved computer program submit the results of the analysis, including boring logs, laboratory data, and any other applicable data for review. The wall supplier shall provide to the Concessionaire an internal stability analysis that validates the design of the wall. Retaining walls shall be designed to control settlements within tolerances identified in VDOT's Guidelines for Preparation of Alternate Retaining Wall Plans.
3. Should any standard for retaining walls not be in accordance with AASHTO LRFD, then the Concessionaire shall verify design and implement a modified version of the requirement such that it is in compliance with AASHTO LRFD.
4. Retaining walls at bridge abutments shall be designed for a minimum service life of 100 years.
5. Except for tie-backs required for the support of retaining walls, all components of the retaining walls shall be contained within VDOT's right-of-way. Tie-backs for retaining walls may be located within permanent underground easements provided that such easements are approved.
6. MSE walls that require traffic protection at the top shall use barriers or railings on moment slabs.
7. Parapets/railings and moment slabs located on top of MSE walls shall use Concrete Low Shrinkage Class A4 Modified.
8. Concrete paved ditches shall be used behind retaining walls, except where the top of the wall is located adjacent to a roadway shoulder in which case an approved concrete barrier system shall be used. Paved ditches shall extend to the back face of the retaining wall. For soldier pile retaining walls, where a post extends behind a retaining wall panel, the ditch shall be located adjacent to the post. The area between the edge of the ditch and the back of the retaining wall panel shall be paved with 4 inches thick concrete, graded to drain away from the wall.
9. For maintenance of the area at the top of a wall or working surface, a VDOT Standard HR-1, or equivalent fencing system as approved, shall be required when routine maintenance or inspection will be performed from the working surface or platform for which there is a 4-foot or greater distance above the next lower surface (OSHA

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1910.23(c)1). All HR-1 railing shall be powder coated in accordance with applicable Standards and Specifications set forth in Attachment 1.5a.

10. The following requirements in the Manual of the Structure and Bridge Division Part 2 File No. 17.01-7 Abutments, General Information and Selection Criteria, Use of MSE Walls and GRS Technology shall not apply to this Project:
 - a. MSE wall location for overpass structures shall accommodate a minimum of one future lane in each direction for the roadway below the overpass.
 - b. MSE wall limits shall extend sufficiently to allow future widening of the overpass by one lane in each direction.

3.15.3 Traffic Structures

A. General

1. If required, Lane Use Management Signs (LUMS) shall be treated in the same manner as overhead sign structures that support variable message signs except that LUMS may be erected on cantilever structures.
2. Small (i.e., 48" x 48' max. size) regulatory type sign panels on bridge structures may be installed using brackets attached to bridge parapets and deck slabs. The edge of sign panels shall clear parapet or rail by a minimum of 12 inches.
3. Span type overhead sign structures shall not be supported on bridge deck blisters. Sign structures shall be supported on pier caps or independent foundations, unless prior written permission allows for mounting to a frame supported by the superstructure. The main bridge beams and girders shall be investigated for fatigue loading from wind loads of the sign structure. The minimum vertical clearance between the bridge deck and sign shall be in accordance with the VDOT Road and Bridge Standards. Cantilever overhead signs shall not be mounted on bridge superstructures or substructures.
4. All poles, including poles for lights, cameras, and microwave vehicle detectors, which are located within the clear zone shall be protected from vehicular impact by guardrail or barrier. Supports shall be configured such that the poles, baseplates and anchor bolts are not located within the Zone of Intrusion for Test Levels 2 and 3; and within the Truck Cab Zone of Intrusion for Test Level 4.

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5. The Concessionaire will be required to obtain a Design Waiver for any overhead sign structures that exceed the maximum span limits as defined in VDOT IIM-S&B-89 – VDOT Modifications to the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.

B. Existing Traffic Structures

1. The Concessionaire may re-use existing sign structures for the combination of the existing and proposed signs and ITS or TMS devices upon the submittal and approval of documents that include a condition assessment based on reviews of the most recent structure inspection reports, a detailed listing and plan of repair items required to address any existing defects in poor or substandard condition (if applicable), existing structural information, structural calculations, details of any proposed repairs and modifications to be performed by the Concessionaire, and a certification statement sealed by a Professional Engineer licensed in the Commonwealth that the structure meets all current structure design criteria and is fully compliant with these Technical Requirements. The structural analysis provided by the Concessionaire for each structure will be reviewed to deem whether or not the existing structure will be permitted to be re-used as proposed. If the Concessionaire's analysis shows that re-use of the structures, with or without modifications, are not structurally acceptable in accordance with the applicable Standards and Specifications in Attachment 1.5a, the Concessionaire shall provide new structures in accordance with the Attachment 1.5a requirements and remove and salvage the existing structures at no additional cost.
2. VDOT Structure ID for any sign and VDOT ITS structure to be modified for reuse or to be removed shall be clearly shown on the plans. VDOT Structure ID for any existing sign may be obtained by contacting VDOT's Northern Virginia District Structure and Bridge Section. VDOT's Northern Virginia District Structure and Bridge Section shall be notified prior to the removal or relocation of any existing traffic structure.
3. Removed existing lighting poles shall not be reused (new lighting poles shall be required).
4. If applicable, existing bridge-mounted sign structures located above the proposed Express Lanes within the project limits shall be removed and if necessary replaced with new signs mounted on independent sign structures.
5. Existing overhead signs mounted to bridge fascia shall be completely removed, including frames, sign panels, hardware, and incidentals.

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Removed materials shall become the property of the Concessionaire and shall be properly disposed of off-site. Connection bolts anchored into concrete parapets shall be mechanically cut flush with the surface of the parapet, and then removed by mechanical drilling to a depth of one-half inch below the surface of the parapet. The holes shall be patched to match the color and texture of the existing parapet surface with hydraulic cement mortar or grout conforming to Section 218 of the Road and Bridge Specifications. Connection bolts to steel beams shall be removed, and the affected areas of steel beams cleaned, primed, and painted in accordance with the requirements of Section 411 of the Road and Bridge Specifications to match the existing structure. Electrical service, where applicable, shall be disengaged at the nearest junction box, and all conductors shall be capped and sealed in place unless existing service is to be reused for lighting of replacement structures.

C. Inspection of Traffic Structures

1. Acceptance of new or modified traffic structures will require an initial safety inspection. The purpose of an initial inspection is to verify compliance with the requirements of IIM-S&B-82 *Traffic Structures* and to identify deficiencies, including incomplete work, and variances from approved plans and specifications and which must be rectified by the Concessionaire before the structure can be accepted.
2. The initial inspection shall be performed by VDOT. The Concessionaire shall provide Approved for Construction (AFC) drawings and working drawings, including all revisions at least two weeks prior to scheduling the inspections.
3. During the initial inspection, data including but not limited to location, date completed, description, horizontal and vertical clearances, structure element description and condition, and traffic safety features will be gathered by the Concessionaire and verified by VDOT.
4. The Concessionaire shall ensure that all structural elements are accessible for inspection of all structures. This requirement may dictate that the Concessionaire provide man-lifts, barges, remote operated vehicles, bucket trucks, or other equipment necessary to inspect the structure and plans, personnel, and equipment to implement traffic control.
5. Upon completion of the initial inspection, VDOT will submit an inspection report to the Concessionaire within 10 days of the inspection either recommending acceptance of the structure or identifying deficiencies, including incomplete work, which must be

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rectified by the Concessionaire before the structure can be accepted. If a structure is not accepted, the Concessionaire shall rectify the deficiencies and certify in writing the deficiencies have been corrected. Within 5 days of receipt of such certification, a follow-up inspection may be performed to verify that the deficiencies have been corrected; upon such time, VDOT will provide a written response to the Concessionaire as to whether the structure is acceptable or deficiencies still exist.

6. The final acceptance of traffic structures will occur when the initial inspection is completed and any necessary follow-up (verification) inspections are performed. The initial inspection may be accomplished through multiple inspections, as long as the inspection program is properly coordinated with all required participants.

3.15.4 Miscellaneous Requirements

- A. The parapet and barrier walls on structures may be constructed using slip forming after review and approval of a trial section.
- B. All temporary shoring and erection elements shall be dismantled and removed in their entirety following construction, unless otherwise approved.
- C. The following utilities shall be designed, furnished, and installed by the Concessionaire:
 1. Lighting on the bridge;
 2. Under bridge lighting (if required); and
 3. Any required Standpipe Fire Hydrant and Water Supply fire protection systems shall comply with the requirements of NFPA 502 Section 6.6. Prior to fire protection acceptance, the Concessionaire shall test with the local authority the hose and standpipe systems for compliance with NFPA 25 and provide a letter from the Fire-Marshall confirming such successful test results.
- D. The Concessionaire shall submit estimated quantities along with the associated unit costs for all standard and non-standard items in the final bridge plan submittal. The structure unit cost data is required to complete the VDOT Annual Bridge Construction Unit Cost Report which is provided to FHWA. This data shall be submitted within 120 days of the approval of the construction plan submittal.
- E. Where any part of a drilled shaft, footing, or any other stiff element is to be permanently located directly beneath any permanent pavement, there shall be a minimum clearance of five (5) feet from the top of finished grade to the top of drilled shaft, footing, or stiff element.

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- F. Drilled shaft for support of bridges and retaining structures shall be constructed in accordance with the requirements of VDOT *Special Provision for Drilled Shafts Using Self-Consolidating Concrete* for Design-Build and PPTA Contracts.
- G. All structure and bridge working or shop drawings shall be reviewed prior to formal submittal. Each submitted working/shop drawing shall be individually annotated with the resulting disposition of the drawing after the review of each sheet. Supporting computations for shop drawings may be stamped on the cover sheet only. Annotation requirements apply to all structures, whether detailed by the supplier (e.g. MSE walls, noise barrier walls, etc.) or designed and detailed by the EOR (e.g. plate girders and prestressed beams).

3.16 Tolling and Traffic Management System

3.16.1 General

- A. The Concessionaire shall be responsible for the planning, design and installation of any ETTM System expansion.
- B. The ETTM System shall be designed, implemented, maintained, repaired, and replaced in accordance with all relevant standards and specifications as set forth in Attachment 1.5a.
- C. All ETTM Equipment, including but not limited to electronic devices, network and computer gear, shall be stored in an environmentally controlled space as required in accordance with manufacture's recommendation.
- D. Definitions and abbreviations:
 - 1. ATMS – Advanced Traffic Management System
 - 2. Burn Period – The time duration required for the ITS devices to successfully operate over consecutive days in a real-world condition, without interruption due to device or system deficiencies or failures.
 - 3. Commissioning – The systematic verification of each component or system of the Opitz Project in question is physically complete, checked, calibrated, and safe for initial operation.
 - 4. HOT-OC – Express Lanes Operations Center
 - 5. MPSTOC – McConnell Public Safety and Transportation Operations Center
 - 6. NRO – VDOT Northern Region Operations
 - 7. Roadside Equipment (RSE) – The Roadside Equipment is to include Dynamic Message Signs (DMS) to provide toll and driver information

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(T&DI) and general traffic management information; Pan-tilt-zoom (PTZ) CCTV and Automated Incident Detection (AID) cameras to provide video surveillance; traffic monitoring sensors to provide traffic volume, lane occupancy, and speed data; roadway gates (and all related systems) at all reversible access points, and all supporting electrical and communications equipment to support the Traffic Management System (TMS), including but not limited to service panels, generators and cabinets.

8. Traffic Management System (TMS) – means any application of computer, electronics and/or telecommunications equipment and software and supporting fixtures and equipment whose function is to provide information, data and/or services to the traveling public, the Department, or to manage and control traffic, and any future systems or services conceived or developed for the same or similar purposes.

3.16.2 Existing ITS Infrastructure

- A. Existing ITS roadside equipment and infrastructure is located within the Project limits. Portions of the ITS roadside equipment and infrastructure are owned and maintained by the Department while other portions are owned and maintained by the Concessionaire.
- B. Existing ITS roadside equipment may include, but is not limited to, the following equipment located within the Opitz Project Right of Way:
 1. Weather stations;
 2. DMS for the existing Express Lanes, and GP Lanes to provide general traffic management and Express Lanes regulatory information;
 3. Express Lanes access gates;
 4. CCTV and AID cameras;
 5. Traffic monitoring sensors (microwave vehicle detectors);
 6. Fiber optic cables;
 7. Generators and UPS; and
 8. ITS and Electrical Cabinets.
- C. The Concessionaire shall relocate existing Department and Concessionaire ITS roadside equipment located within the Opitz Project Right of Way that is affected by construction, including power and communication service to the equipment, and shall ensure that loss of functionality is planned and minimized.

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- D. The Concessionaire and Department will remain responsible for the operations and maintenance of the existing and relocated Concessionaire and Department ITS roadside equipment, respectively upon completion of construction.

3.16.3 Business and Toll Operating Model

- A. The business and toll operating model shall comply with the requirements of the Agreement.
- B. Connectivity to the HOT-OC shall be provided to support facility administration, traffic management, Incident response, maintenance and tolling operations including handling of services directly related to the operation and maintenance of the HOT Lanes.
- C. Transponders that are read will be interoperable with the E-ZPass network (or any successor to E-ZPass used on other State Highways) and issued by either the Department or by another member of the Interagency Group (IAG).
- D. Equipment shall be installed allowing individual toll sections to be separately charged, with rates appropriate to the prevailing traffic flow conditions on the road.
- E. Toll pricing shall be in accordance with the Agreement.
- F. A Violation Enforcement System (VES) shall be implemented to enable detection, payment collection and toll enforcement for vehicles for which a valid E-ZPass transponder is not read or for which a pre-arranged payment cannot be applied via vehicle license plate. Enforcement shall follow practices established on similar systems and shall be in compliance with Law. Enforcement may include, but not be limited to, manual processes, video enforcement, integrating customer service, technology and operational performance elements.
- G. An enforcement area shall be provided at or near each tolling point or as agreed by the Concessionaire for enforcement operations to provide a safe location adjacent to the toll gantries or other locations for a law enforcement vehicle.

3.16.4 Systems Integration and Protocols

- A. The Concessionaire shall implement a system engineering approach, consistent with FHWA 23CFR Part 940 Intelligent Transportation System Architecture and Standards (Federal Rule 940), in the development of systems and their associated interfaces. The system engineering approach shall address the following items where applicable:
 - 1. system architecture
 - 2. system specification

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3. interface identification
 4. interface specification
 5. interface control
 6. system integration
 7. configuration management
- B. The HOT Lanes TMS shall be required to interface to the Department's Northern Region Operations (NRO) ATMS at the McConnell Public Safety and Transportation Operations Center (MPSTOC) consistent with the *Capital Beltway I-495 HOT Lanes Program TMS to the VDOT NRO PSTOC ATMS External Interface Control Document (ICD)* and as amended for the Project.
- C. The Concessionaire shall develop and maintain a project-level ITS architecture that is coordinated with the Department's ITS architecture and the National Capital Region ITS Architecture. The project-level ITS architecture shall document all interconnects and information flows between the HOT-OC and the NRO MPSTOC ATMS.
- D. The Concessionaire shall prepare and submit to the Department, the *VDOT ITS Projects – Systems Engineering and Architecture Compliance (Rule 940) Checklist*. The Checklist shall demonstrate that the Opitz Project is in compliance with Federal Rule 940.
- E. Subject to the Agreement, the Concessionaire shall ensure that such standards, protocols and interfaces are represented in the HOT-OC Central Control Computer System (CCCS), so as to make the TMS system interoperable with the NRO MPSTOC ATMS in accordance with the Interface Control Document (ICD), including any mutually agreed revisions during the Operating Period.

3.16.5 ETC AND TMS System Design Documentation

The following ETC system and TMS design documentation (collectively, the "ETTM System") shall be prepared and submitted to the Department by the Concessionaire:

- A. Functional Requirements – such requirements shall be documented in the Concept of Operations (Exhibit C-4, Attachment 4.1) and shall include characteristics of the ETTM Equipment with regard to its intended capability, including reversible gate operations and gate control. The documentation shall describe the intended behavior and functionality of the ETC and TMS and the operational interaction with the NRO MPSTOC ATMS.
- B. Technical Specifications - shall be a document or documents that specify the technical design of the integrated sub-systems that will comprise the ETTM System and its interfaces, including reversible operations and gate control.

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- C. ICD – shall be a document that describes the physical and logical architecture of system interface between the HOT-OC TMS and the NRO MPSTOC ATMS.
- D. Process definition deliverable or other agreed document – shall set out the business processes relating to the ETTM System (subject to intellectual property regulations, and the requirements of the Agreement) and the processes for interacting with the appropriate the Department system and/or other systems as required. The process definition deliverable will address reversible lanes and gate operations.
- E. Test strategy – shall establish the principles of, and the Concessionaire’s approach to, the testing of the ETC system and TMS and their interfaces, including the test stages and processes.
- F. Security plan – shall be a document (or part of another document) that sets out how the security of the ETTM System shall meet the relevant requirements for enforcement evidence and that data are held securely and only accessible to authorized personnel.
- G. Disaster recovery plan – shall be a document (or part of another document) that sets out the procedures to be adopted in the event of failure of the ETTM System.

3.16.6 Design of the Electronic Tolling System

- A. The ETC system shall be provided to impose, charge, collect, and enforce payment of tolls and other incidental fees and charges in accordance with the Agreement.
- B. The ETC system is to comprise the following equipment and/or systems:
 - 1. ETC system roadside equipment; and
 - 2. ETC system equipment and/or subsystems.
- C. The ETC system roadside equipment is to comprise:
 - 1. Transponder detection equipment; and
 - 2. Control equipment.
- D. Access to the ETC system overhead and roadside equipment shall be provided such that it does not jeopardize the safety of authorized personnel.
- E. The ETC system shall have a Transponder Transaction Performance of at least 99.90% under normal operation, for properly fitted and operating transponders, excluding signal attenuation due to metallic wind screen or other similar conditions beyond the reasonable control of the Concessionaire.

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- F. The ETC system and dynamic pricing algorithm module shall:
1. receive data gathered from each road segment on traffic volumes, lane occupancy, and speed data at detection points from the TMS; and
 2. adjust toll prices in order to maintain Free-flow traffic conditions in accordance with the Agreement.
- G. The Concessionaire shall provide toll charge transaction information in compliance with the current version of the following:
1. *Discount Plan Interface: Virginia Toll Facilities Group – VDOT CSC Specifications*
 2. *Toll Corrections File Interface: Virginia Toll Facilities Group – VDOT CSC Specifications*
 3. *Toll Reconciliation Response File Interface: Virginia Toll Facilities Group – VDOT CSC Specifications*
 4. *Transponder – Account Number File Interface: Virginia Toll Facilities Group – VDOT CSC Specifications*
 5. *Virginia Department of Transportation E-ZPass Service Center (Block Box) Interface Specifications*
 6. *Outgoing Correspondence Interface: Virginia Toll Facilities Group – VDOT CSC Specifications*
 7. *VTOLL Interface: Virginia Toll Facilities Group – VDOT CSC Specifications*
 8. *License Plate Interface: Virginia Toll Facilities Group – VDOT CSC Specifications*
- H. The Concessionaire shall develop, as needed, any additional interface file format and transfer protocols for the transmission of ETC data and related information in cooperation with the Department and in accordance with the ETC Agreement.
- I. Communication between the ETC system roadside equipment and the HOT-OC shall be via a fully redundant network.

3.16.7 Design of the Violation Enforcement System

- A. A Violation Enforcement System (VES) shall be provided that detects vehicles using the HOT Lanes that do not have a transponder or a valid transponder.

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- B. The VES is to comprise:
 - 1. image capture equipment; and
 - 2. control equipment.
- C. When tolls for any toll section are suspended, there shall be a means to suspend vehicle enforcement.
- D. The VES roadside equipment shall have an In-service Availability (ISA) of at least 99.90%, excluding the effect of any condition beyond the reasonable control of the Concessionaire.

3.16.8 Design of the Integrated Roadside Units

- A. The Concessionaire shall provide suitable integrated roadside units (IRUs) housing electrical components for the relevant ETTM Equipment as required.
- B. The IRUs shall be equipped with the following provisions:
 - 1. HVAC systems as required to support installed equipment and
 - 2. intrusion detection.
- C. Each service panel for the Opitz Express Lanes IRUs shall be capable of monitoring and reporting alarms for the main power and each branch circuit, the current flow and any tripped breakers.
- D. If telemetry is used, IRUs shall be powered by an uninterruptible power source to enable the telemetry to communicate for the first 60 minutes after a power failure.
- E. Service panels feeding IRUs shall be equipped with a backup generator sized to accommodate the attached electrical load and any other roadside equipment, including DMS, connected to the service panel.
- F. The IRU's canopy structural design shall be designed and constructed giving consideration to its life cycle. Allowable design bearing capacities shall be established to minimize foundation settlements and associated settlement cracking. These capacities shall be field verified by the Engineer prior to construction.

3.16.9 HOT-OC

- A. The Concessionaire and Department agree that the existing HOT-OC shall be used for the Opitz Express Lanes in accordance with the Agreement.

3.16.10 Traffic Management System (TMS)

- A. A TMS shall be provided that meets the requirements of the Agreement and enables the Concessionaire to monitor and manage traffic flow on the HOT Lanes.
- B. The TMS must allow the Concessionaire to:
 - 1. support response to Emergency situations on the HOT Lanes in the shortest possible timeframe;
 - 2. manage traffic flow on the HOT Lanes;
 - 3. control reversible flow, including access gates and any regulatory DMS, on and approaching the HOT Lanes;
 - 4. detect and manage traffic Incidents effectively, through a comprehensive Incident management system, to mitigate the impacts of Incidents and prevent secondary Incidents occurring;
 - 5. provide credible and timely driver information about travel times, traffic conditions and Incident situations, contribute to the calculation of dynamic toll prices through the provision of traffic conditions data, and provide timely and accurate toll prices to motorists related to HOT Lanes;
 - 6. provide an interface with the NRO MPSTOC ATMS in accordance with the ICD;
 - 7. support provision of driver aid to motorists in vehicles that have stopped on the HOT Lanes;
 - 8. permit the NRO MPSTOC ATMS to control DMS (HOT Lanes) via the HOT-OC TMS in accordance with the Agreement;
 - 9. permit the NRO MPSTOC ATMS to control HOT Lanes access gates via the HOT-OC TMS in accordance with the Agreement;
 - 10. permit the NRO MPSTOC ATMS to change the time periods of reversible flow via the HOT-OC CCCS in declared Emergency events in accordance with the Agreement;
 - 11. provide for the control and monitoring of TMS components and subsystems through a modern and comprehensive computer-based control facility using graphical user-interface (GUI); and
 - 12. monitor facilities, plant, and equipment, if required.
- C. The TMS is to comprise the following equipment and/or systems:

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1. TMS roadside equipment; and
 2. TMS equipment and/or systems located in the HOT-OC and IRUs.
- D. The TMS roadside equipment is to include:
1. DMS for the HOT Lanes to provide toll and driver information (T&DI) and general traffic management information;
 2. Pan-tilt-zoom (PTZ) CCTV cameras to provide video surveillance;
 3. traffic monitoring sensors to provide traffic volume, lane occupancy, and speed data;
 4. lane control devices, if applicable; and
 5. roadway gates (and all related systems) at all reversible access points.
- E. The TMS HOT-OC-based equipment and/or systems are to comprise:
1. Automatic Incident Detection (AID) subsystem
 2. CCTV subsystem
 3. CCCS
- F. The CCCS shall have an ISA of at least 99.995% and the CCCS (redundant components) of at least 99.9%, excluding the effect of any condition beyond the reasonable control of the Concessionaire.
- G. The TMS roadside equipment shall have an ISA of at least 99.9%, excluding the effect of any condition beyond the reasonable control of the Concessionaire.
- H. Equipment cabinets shall be provided for the TMS roadside equipment at appropriate locations along the alignment and within the Project Right of Way.
- I. Existing Department-owned TMS roadside equipment that may be taken over by the Concessionaire will be removed or integrated into the new TMS system.

3.16.11 CCTV Video Coverage

- A. Dedicated CCTV cameras shall be provided for the following functions:
1. Surveillance of the HOT Lanes including, approaches and interchanges
 2. AID on the HOT Lanes

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- B. Surveillance CCTV video coverage must be provided by PTZ CCTV cameras mounted on poles to enable HOT-OC operators and Department operators (under agreed circumstances in accordance with the Agreement) to observe traffic within the limits of the HOT Lanes at all hours of the day and in all weather conditions normally encountered in Virginia, consistent with reported visibility restriction (such as during snow events, rain storms, or fog). The video provided must be stable and jitter-free.
- C. The Concessionaire shall replace the Department's cameras that are disturbed by the Work.
- D. Dedicated cameras shall be provided for surveillance of the HOT Lanes or to enable video-based AID under Concessionaire HOT-OC operator control.
- E. CCTV line-of-sight distances shall provide for full CCTV coverage of the Opitz Express Lanes without image degradation. The CCTV cameras shall be placed at a minimum mounting height of forty (40) feet unless the camera is a fixed camera provided solely for DMS message verification in accordance with Section 3.16.16.F, in which case lower mounting heights will be permissible.
- F. All cameras installed by the Concessionaire shall meet the requirements of the Opitz Special Provision for Section 814 – Camera System.
- G. The video surveillance system must enable the identification of the number and vehicle types involved in an Incident at all locations within the surveillance area.
- H. The video provided must be stable at all zoom settings when viewing objects up to one mile away.
- I. Where a Concessionaire camera is relocated from a mounting pole that also supports a Department camera, the Concessionaire shall modify the mounting pole upon relocation of Concessionaire camera to remove all defunct equipment to preserve functionality of the Department camera.

3.16.12 Video-based AID

- A. The Concessionaire shall implement video-based AID for the HOT Lanes at locations where:
 - 1. Roadway gates are installed;
 - 2. Traffic enters or exits the Express Lanes;
 - 3. the risk of traffic Incidents is expected to be higher than average, and
 - 4. rapid detection of Incidents is required for special reasons, such as near critical infrastructure.

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5. Wrong-way vehicle detection.
- B. The video-based AID system should be compatible to the existing HOT-OC Traffic Management System and capable of:
1. detecting 95% of Incidents involving stopped vehicles, slow vehicles, and slow traffic that are within the field of view of an AID camera or other equipment as specified;
 2. detecting pedestrians on the roadway within the field of view of an AID camera or other equipment, as specified;
 3. a false alarm rate of less than one false alarm per 10 true alarms; and
 4. detecting Incidents and providing an alarm to the HOT-OC in less than 30 seconds
- C. Upon the detection of an Incident, the AID system must be capable of recording the video at a rate of at least five frames per second for a period of 60 seconds.

3.16.13 Video Recording

- A. It shall be possible to simultaneously record video from CCTV cameras, as designed, at a rate of at least one (1) frame per second.
- B. Sufficient capacity must be provided to store the recorded video from CCTV cameras for a duration determined by the Concessionaire and continue to record video without intervention.
- C. Video footages from VDOT CCTV cameras shall not be recorded or stored.

3.16.14 CCTV Communications Standards

- A. The CCTV communications shall support the appropriate National Transportation Communications for ITS Protocol (NTCIP) 1205 communication protocol (version 1.08 or higher) to provide for functionality with the NRO MPSTOC ATMS software in accordance with the Interface Control Document (ICD).

3.16.15 Traffic Monitoring Sensors

- A. Traffic monitoring sensors are to be installed to monitor and report in real-time traffic volume, lane occupancy and speed data on the HOT Lanes and, where available, the GP Lanes. Such sensors shall enable the Concessionaire to monitor the performance of the Opitz Project corridor.
- B. Information collected on the GP Lanes and HOT Lanes will be made available into the existing Project systems. Data will be provided in raw form and be

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subject to quality control requirements prior to submittal to the Department. Data shall be aggregated in increments to be mutually agreed.

- C. Traffic monitoring sensors shall be installed by the Concessionaire approximately every 1/3 mile to 1 mile on the HOT Lanes and, as applicable on GP Lanes, or as necessary to meet operational requirements. Under unusual circumstances or in specific situations, longer spacing may be used as long as data collection and operational requirements are met.
- D. Traffic monitoring sensors shall be installed on ITS poles based on the manufacturer's recommended mounting heights and roadway geometry. Each detection zone shall be shown on plans as a part of the final Design Documentation. Traffic monitoring sensors shall be located to gather data from both the 95 Express Lanes and GP Lanes wherever possible.

3.16.16 Dynamic Message Signs (DMS)

- A. The toll and driver information DMS for the HOT Lanes shall be located at strategic locations throughout the corridor and will display information to allow drivers to make decisions on whether to use the HOT Lanes. The proposed locations are shown on the Opitz Design Plans. The information to be displayed may indicate:
 - 1. price levels for up to three major destination points for each point of entry;
 - 2. travel-time information for HOT Lanes for up to three major destination points.
- B. DMS shall be installed at suitable distances from the HOT Lanes entry points to support motorist decision making and orderly movement of traffic.
- C. The Concessionaire shall coordinate the location of DMS with the Department to avoid over-populating signs and to seek co-location opportunities. The Opitz Project signing roll plans will identify over-population and potential co-location opportunities. The Concessionaire shall incorporate agreed upon recommendations in the final Design Documentation.
- D. The T&DI DMS shall have the following minimum features:
 - 1. full graphics color LED display
 - 2. capability to display congestion levels on HOT and GP lanes on each tolling section;
 - 3. capability to display toll price for destination points;

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4. capability to display travel-time information for GP Lanes and HOT Lanes or, alternatively, the travel time difference between GP Lanes and HOT Lanes,
 5. capability to display traffic management information, including warning and recommended diversions;
 6. advanced fault detection and reporting; and
 7. conformance to the National Transportation Communications for ITS Protocol (NTCIP) communications protocol or other industry protocol agreed with the Department.
- E. If communication with the HOT-OC CCCS is lost and the T&DI DMS has no reported errors, the T&DI DMS shall display a user-defined graphic/message.
- F. DMS cabinets shall be placed in front of DMS at a distance such that authorized personnel can read the message displayed on the DMS while working at the DMS cabinet. Each DMS shall be viewable by at least one PTZ CCTV camera such that the message displayed on the DMS can be visually confirmed by an operator in the HOT-OC.
- G. The traffic management DMS shall have the following minimum features:
1. full graphics color LED display
 2. capability to display traffic management information, including warning and recommended diversions;
 3. advanced fault detection and reporting; and
 4. conformance to the NTCIP communications protocol or other industry protocol agreed with the Department.
- H. The DMS must not display erroneous information due to a fault with the sign or the loss of pixels.

3.16.17 TMS Availability

- A. An ISA of at least 99.99% is required for the following functions, excluding the effects of any condition beyond the reasonable control of the Concessionaire:
1. calculation of dynamic toll prices and provision of information to other systems/ devices.
- B. All other TMS functions, unless noted otherwise, must have an ISA of at least 99.9%, excluding the effects of any condition beyond the reasonable control of the Concessionaire.

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- C. In cases where redundancy is provided, the system must switch between redundant components seamlessly (without impact to operator functionality). The system must also provide the capability to manually switch between redundant devices to support software upgrades/revision and maintenance procedures.

3.16.18 Communications Infrastructure

- A. The existing communications infrastructure must remain in place or be replaced in kind, as specified in the standards and specifications set forth in Attachment 1.5a.
- B. Communication between the ETTM Equipment and the ETTM Facilities shall be via a fully redundant fiber optic network using Open Shortest Path First (OSPF) protocol (or equivalent) to ensure no single points of failure and reliability and shall comprise the following, if applicable:
 - 1. Opitz Express Lanes trunk fiber optic loop;
 - 2. Opitz Express Lanes distribution fiber optic loop(s); and
 - 3. Necessary connections and/or interfaces with the redundant fiber optic ring (provided by the Department).
- C. The Opitz Express Lanes trunk and distribution fiber optic loops shall be comprised of new armored fiber optic cable.
- D. All new fiber optic cables shall be protected to prevent rodent damage, including but not limited to installing screens at bases of all ITS poles, completely sealed manhole covers without manhole hook holes to eliminate rodent entry.
- E. The new communications conduit bank for the Opitz Project shall consist conduits with the following configuration:
 - 1. one four inch conduit containing a 3-barrel inner duct carrying a 36-fiber Express Lanes distribution cable;
 - 2. one four inch conduit containing a 3-barrel inner duct carrying a 36-fiber Express Lanes trunk cable; and
 - 3. spare capacity in Express Lanes distribution and trunk conduit(s), as shown on the Opitz Design Plans, containing appropriate pull tape.
 - 4. Conduit requirements for Opitz Project work impacting existing or involving new Department communications conduit shall be coordinated with the Department during development of the Opitz Design Plans.

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- F. Communications and conductor cables shall be placed in separate buried conduits, embedded conduits, or structure and bridge-mounted conduits. Communications and conductor cables shall not share conduits, junction boxes, or related appurtenances.
- G. The Concessionaire shall coordinate with the Department to determine which fibers will need to be spliced to the existing 95 Express Lanes fiber to provide connectivity to the Express Operations Center. The Concessionaire shall be responsible for providing the necessary switch capacity and optics to support connectivity to the existing infrastructure.
- H. The Concessionaire shall provide fiber splicing diagram plans showing details of every splice and termination for every fiber strand as a part of the final Design Documentation. The number, color, and fiber assignment of each buffer tube and fiber strand shall be included. No underground splices shall be allowed.
- I. The maximum allowed cable length of a Category 5 or 6 Ethernet cable is 328 feet. If a longer running distance is needed, a media converter shall be used to convert Ethernet data to fiber optic signals.
- J. The Concessionaire shall furnish and install new ITS equipment cabinets for exclusive use to support the Opitz Project devices. Existing Department equipment cabinets shall not be used. The Concessionaire shall remove all defunct equipment.
- K. The Concessionaire shall furnish and install new conduit for exclusive use by the Express Lanes ITS equipment. Existing Department conduits shall not be used. The Concessionaire shall remove all defunct equipment.
- L. Where equipment is relocated or removed from an existing Department cabinet, the Concessionaire shall remove all non-operational equipment, and the cabinet must be kept in a manner that preserves the functionality of any remaining Department equipment.
- M. Locator Wire
 - 1. All duct banks, trenches, and bores containing non-metallic conduits with non-locatable cable (fiber optic) shall have at least one locator wire installed between all junction boxes or cabinets.
 - 2. At all locations where non-locatable conduit is installed in a common trench, and a non-locatable conduit diverges from the common trench, a locator wire shall be installed in both trenches.
 - 3. All locator wires shall be installed inside of conduit and shall run continuously from junction box to junction box.

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4. Locator wire shall be an insulated #8 AWG stranded copper wire. The insulation shall not be green in color.
- N. The Concessionaire is responsible for designing the connection diagrams, including the communications equipment to be provided in each cabinet and how the equipment connects to the fiber optic cables. The design shall be consistent with the 95 Express Lanes Network Architecture as described in the diagram in Opitz Special Provision 817.
- O. The Concessionaire shall be responsible for the construction and installation, testing, and commissioning of any necessary connections to the Department's fiber optic network and associated interface management, including any associated connection or splicing fees. This connection shall be made at the location shown in the Opitz Design Plans.

3.16.19 Existing Department TMS Roadside Equipment

- A. Existing Department TMS roadside equipment or third-party TMS roadside equipment installed under permit with the Department may include the following equipment located within the Opitz Project Right of Way:
1. weather stations;
 2. DMS for the existing GP Lanes to provide general traffic management and HOV regulatory information;
 3. CCTV cameras; and
 4. traffic monitoring sensors.
- B. The Concessionaire shall relocate existing Department TMS roadside equipment located within the Opitz Project Right of Way that is affected by construction, including power and communication service to the equipment, and shall ensure that loss of functionality is planned and minimized.
- C. Any third-party TMS roadside equipment located within the Opitz Project Right of Way that is affected by construction, including power and communication service to the equipment, shall be relocated by the third-party equipment owner under the direction of the Department at no cost to the Concessionaire. The Concessionaire shall provide notification of disturbance of equipment three weeks prior to commencing such activities.
- D. The Department will remain responsible for the operations and maintenance of the existing and relocated Department TMS roadside equipment. However, during the Operating Period, the Concessionaire shall operate and maintain the access gates and any DMS ties to the access gates.
- E. Third-party equipment owners shall remain responsible for the operation and maintenance of their existing and relocated TMS roadside equipment.

3.16.20 Interface with the NRO MPSTOC ATMS

- A. The interface with the NRO MPSTOC ATMS shall comply with the requirements of the ICD.
- B. TMS shall not affect any change to the NRO MPSTOC ATMS or the procedures for the operation and maintenance of the NRO MPSTOC ATMS unless otherwise required by the provisions of the Technical Requirements and the ICD.
- C. The ETC and TMS shall not cause any unscheduled interruption or adverse effect to the continued functioning of the NRO MPSTOC ATMS or the operations supporting it.
- D. The NRO MPSTOC ATMS shall not cause any unscheduled interruption or adverse effect to the continued functioning of the ETC and TMS or the operations supporting it.
- E. The ETC and TMS shall be capable of being electrically (and, where relevant, optically) and mechanically isolated from the NRO MPSTOC ATMS.
- F. The Concessionaire shall:
 - 1. provide external electronic interfaces between the ETC and TMS and the NRO MPSTOC ATMS in accordance with the ICD;
 - 2. work with the Department and its subcontractors to construct, test, and operate all specified interfaces; and
 - 3. prepare and document the designs as outlined in the Agreement, which may include but not be limited to the following:
 - i. the content of the data to be exchanged;
 - ii. the format of the data to be exchanged;
 - iii. the static data which are required to decipher the meaning of the data exchanged;
 - iv. the bearer protocols to be used;
 - v. any sequencing constraints or assumptions;
 - vi. error handling measures;
 - vii. measures to ensure data integrity;
 - viii. the nature of testing and the associated test data to be used; and

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- ix. any other information necessary for the interface to operate correctly.
- G. The TMS shall have a mechanism to control the rate of transmission of messages/file to the NRO MPSTOC ATMS, with such mechanism being mutually agreed to and in accordance with the ICD.
- H. If the interface to the NRO MPSTOC ATMS is unavailable, the TMS System shall be able to store relevant records for an agreed period of up to five days on secure media and transmit them to the NRO MPSTOC ATMS once the interface is restored.

3.16.21 Data Processing Capacity

- A. The Concessionaire shall ensure that the ETTM System has sufficient data processing capacity.

3.16.22 Alarm Reporting

- A. The ETTM System shall have the capability to monitor the status of all relevant components and to raise alarms in the event of component failure, performance degradation, or any other potential issues that might adversely affect the operation or performance of the ETTM Equipment.

3.16.23 Security

- A. The Concessionaire shall prepare and submit prior to Final Completion to the Department a security plan (“Security Plan”) for the HOT Lanes operations.
- B. The Security Plan shall embody the following key principles for the protection of data:
 - 1. Integrity: Data shall be protected from being corrupted by unauthorized changes, whether by system error, human error, or intentional alteration. Data shall only be modified by authorized users according to defined privileges and procedures.
 - 2. Confidentiality: Data shall be protected from unauthorized disclosure. Access to systems shall be restricted to authorized users with privileges appropriate to the confidentiality of the data.
 - 3. Availability: Data shall be prevented from being lost or becoming inaccessible. Authorized users shall be able to gain access to information to which they are privileged whenever they are authorized to do so.
- C. VDOT ITS and traffic signal cabinets shall be secured using Medeco XT Traffic Cabinet Locks and in accordance with the Virginia Information Technologies Agency (VITA) SEC-501 Information Security Standard.

3.16.24 Disaster Recovery

- A. The Concessionaire shall prepare and submit prior to the Date of Service Commencement to the Department an update to the disaster recovery plan (“Disaster Recovery Plan”) for the HOT Lanes operations, which may include the following:
 - 1. mitigating any adverse impact on the ETC system and its operation and/or TMS, in any circumstances where the ability of the Concessionaire to provide the operation of the ETTM System would otherwise be impaired; and
 - 2. making provision for action to be taken by the Concessionaire in the event of the unavailability of its premises.
- B. The Disaster Recovery Plan shall identify the measures to be taken in the event of:
 - 1. HOT-OC site loss
 - 2. Roadside equipment site loss
 - 3. System data loss or corruption
 - 4. Systems failure
 - 5. Failure of the communications link with the NRO MPSTOC ATMS
 - 6. Failure of the communication links between the roadside equipment and the HOT-OC
 - 7. Loss of power in the locality
 - 8. Inability of staff to gain access to, or work effectively at, the HOT-OC facility.

3.16.25 Performance Recording and Reporting

- A. The ETTM System shall incorporate the necessary tools to enable the recording and reporting of performance to meet the requirements under the Agreement.

3.16.26 Testing

- A. The Concessionaire shall submit to the Department a test strategy for the Opitz Express Lanes that shall include as a minimum:
 - 1. the scope, requirements and objectives of testing with a testing and systems integration period of no less than 120 days;

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2. an overall high-level plan for testing the ETC and TMS, including the test stages and processes and the scheduling of all tests prior to the Date of Service Commencement; and
 3. the roles and responsibilities of all those involved with the testing program and any dependencies on third parties, including Department personnel.
- B. Testing and commissioning, where applicable, shall be based on the application of a systems engineering methodology such as ANSI/GEIA EIA-632. Testing and commissioning shall be the primary responsibility of the Concessionaire with input and support from the Department and shall utilize:
1. a Verification Cross Reference Index (VCRI), which will be developed and documented to establish the way in which requirements are satisfied. The VCRI shall utilize test, demonstrate, inspect and analyze as methods for acceptance;
 2. a test series that shall demonstrate compliance with the performance requirements through a test plan and procedures;
 3. a testing strategy document that details how the testing plan will be implemented to demonstrate conformance of the proposed solution to the various functional, technical, and performance requirements; and
 4. a test plan document that describes how the testing strategy will be executed to demonstrate the various functional, technical, and performance requirements for compliance to requirements, which shall include:
 - i. test specifications for each of the test cycles
 - ii. detailed requirements traceability matrix linking each of the test series to relevant requirement(s)
 - iii. detailed test script(s) for each of the test series, including input / process / output at each of the steps so that conformance can be monitored.
 5. The testing strategy for the Opitz Express Lanes will provide the level of detail to ensure compliance with the overall testing requirements. This testing strategy shall include:
 - i. System design and integration overview. The Concessionaire will provide this documentation.

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- ii. Level A Testing – The objective of this test is to certify Roadside Equipment installed by the Concessionaire is installed and fully operational in line with agreed design requirements and via executing test plans and procedures approved and witnessed by the Department. The Concessionaire shall be responsible for this test and shall be accountable for successful and on-time execution of this test.
- iii. Level B Testing – The objective of this test is to certify Roadside Equipment is successfully integrated with other ETTM Facilities via executing test plans and procedures approved and witnessed by the Concessionaire. The Concessionaire shall be responsible for this test and shall be accountable for successful and on-time execution of this test.
- iv. Level C Testing – The objective of this test is to certify that Concessionaire’s ETTM System communicates and controls roadside equipment via executing test plans and procedures defined by the Concessionaire. The Concessionaire will be responsible for this test and shall be accountable for successful and on-time execution of this test
- v. Factory Acceptance Testing - tests to be conducted at the supplier’s premises to verify that the equipment, subsystem or system complies with the functional and performance requirements of that supplier’s subcontract.
- vi. Site Acceptance Testing - tests to be conducted at the point of installation (tolling point and HOT-OC) to confirm the factory acceptance testing results, plus any omissions and/or errors noted during the factory testing
- vii. Integration Acceptance Testing - a test conducted to ensure that the complete ETC and TMS meets the end- to-end system-level functional and performance requirements in normal operating conditions. The Concessionaire will provide this documentation.
- viii. User Acceptance Testing - to ensure that individual functions operate as defined in the requirements specification or similar documents and the complete end-to-end process is tested. User Acceptance Test will be completed at least thirty (30) days before Service Commencement of the ETTM. The Department will approve successful completion of the UAT for Service Commencement. The Department will provide this documentation.

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3.16.27 Training

The Concessionaire shall develop and conduct a minimum of two information sessions for the Department in the operations and maintenance of the HOT TMS, if required as mutually agreed.

- A. The target audience for one information session shall be the Department's management staff and duty officers. The session shall include an overview of the capabilities and procedures used to operate the HOT lanes.
- B. The target audience for one information session shall be the Department's TOC operators and controllers and shall include detailed daily procedures used by the HOT TMS in interface with the NRO MPSTOC and management of Incidents.

3.16.28 Standards

- A. The ETTM System shall be designed, implemented, maintained, repaired, and replaced in accordance with all relevant standards and specifications as set forth in Attachment 1.5a.

3.16.29 Department Testing and Integration Obligations

- A. The Department will participate as necessary in the requirements for testing and integration as outlined above where such testing and integration involves the Department's infrastructure. The Concessionaire shall schedule adequate time for notification and testing by the Department.

3.16.30 Roadway Gates

- A. Gate cabinets shall be placed to ensure safe and unimpeded access by authorized personnel. Roadway gates shall be designed and installed, including but not limited to tapered lengths and height above finished roadway, to fully close the ramps at all reversible access and egress points such that vehicles cannot go around a closed gate. Installed length of gates shall consider pavement markings, gore areas, and ramp widths. The Concessionaire shall submit a complete gate arm length schedule table for review and approval as a part of the Design Documentation.
- B. A gate cabinet shall be placed at locations where the technician and other authorized personnel can see the gates while working at the gate cabinet. All gates shall be viewable by at least one PTZ CCTV camera such that the gate open or close position can be visually confirmed by appropriate HOT-OC personnel.

3.16.31 Maintenance Access

- A. All RSE cabinets, foundations, concrete pads, and junction boxes shall be installed at elevations and locations that facilitate maintenance and provide

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safe access. Handrails shall be installed for protection at locations with fall hazards.

- B. Junction boxes shall not be installed in roadways, driveways, parking areas, ditches or public sidewalk curb ramps. The Concessionaire shall avoid placing junction boxes in low-lying locations with poor drainage. Electrical junction box length (long side) shall be parallel to the conduit run. When the conduit run is perpendicular to the roadway at the junction point, the junction box shall be parallel to the roadway. The maximum spacing between any two adjacent electrical junction boxes shall be 500 feet. The maximum spacing between any two adjacent communication junction boxes be 500 feet.

3.16.32 Specified New ITS Roadside Equipment

A. New TMS Roadside Equipment used on the Opitz Project shall be as specified in the table below to ensure the equipment will be fully compatible with the existing 95 Express Lanes TMS and operating protocols.

Device	Equipment Make/Model	Firmware Version
Generator/Tank with PLC Comms from TS&T	**Cummins 35GG + Comm Cabinet	latest
Telemetry Remote Terminal Unit	Moxa ioLogic E4200	latest
Telemetry Remote Monitor	Cummins PowerCommand PCC500 (SNMP)	latest
Industrial Ethernet Access Switch	Cisco IE-4000-8T4G-E	latest
Industrial Ethernet Access Switch Power Supply	Cisco PWR-IE50W- AC	N/A
CCTV Pan-Tilt-Zoom Camera	CohuHD Costar 4260HD RISE 4260 Series Positioner	latest
CCTV Automatic Incident Detection Camera	Cohu 3430HD Series Fixed Barrel	latest
CCTV Pan-Tilt-Zoom Camera (VDOT)	CohuHD Costar 4220HD RISE 4260 Dome Positioner Series	latest
Microwave Vehicle Detection	Wavetronix Smart Sensor HD	latest
DMS Type 2	**Daktronics Vanguard VF-2420-64x192-20-RGB	latest
DMS Type 2A	**Daktronics Vanguard VF-2420-96x288-20-RGB	latest
Vertical Roadway Gate (Straight Arm Channel and Offset Arm)	B&B Roadway VW-4 Vertical Warning Gate	latest
Horizontal Roadway Gate	B&B Roadway HW-4 Horizontal Warning Gate	latest
Roadway Gate Controller	170E Controller with VDOT Firmware and 170 Ethernet Card	latest
Cabinet Power Strip	Digital Loggers Web Power Switch 7	latest
Uninterruptible Power Supply	ZincFive Ultra Power Stealth UPS with SNMP and 500W Battery	N/A
Traffic Cabinet Lock (VDOT)	Medeco XT Traffic Cabinet Lock	N/A

Notes:

Firmware version indicates Equipment Make and Model Numbers required for seamless integration into existing TTMS software

***Indicates verification required based on project requirements*

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Device	Equipment Make/Model	Firmware Version
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DMS type and size shall be verified with the project requirements, design and specifications

Generator type and size shall be verified with the project requirements, design and specifications

Transurban Operations supplies gate firmware

Model numbers are subject to change based on product availability (successor model numbers shall be submitted to the Concessionaire for approval)

3.16.33 Maintenance of 95 Express Lanes Operating Systems

- A. No shutdown of the 95 Express Lanes System shall be permitted during the installation and testing of the Opitz Project elements.
- B. For any temporary impacts or isolated shut-down of system elements, the Concessionaire shall coordinate directly with the Department regarding any Work within the 95 Express Lanes or Department assets, or Work impacting any 95 Express Lanes facilities or equipment.

3.16.34 Not Used

3.16.35 Notification of Impact (NOI) to Department Equipment

- A. As part of the overall construction of the Opitz Project, a process for controlling the Work that will impact Department traffic management system equipment is required. A significant portion of this work will depend on field conditions and the state of the system, neither of which can be determined during the design phase. The impact of construction on the Department equipment shall be coordinated by the Concessionaire by the Notification of Impact (NOI) to the Department.
- B. This NOI process shall apply to all Department traffic management system components (referred to herein as “the Equipment”) that are impacted by the Concessionaire’s construction activities resulting from the Opitz Project.
- C. The Work shall be governed by the general requirement that the impacted Department Equipment shall be maintained or returned to a condition equal to or better than the condition at the start of construction unless otherwise indicated in the plans or approved by the Department. This shall include both the functionality and maintainability of the Equipment.
- D. While this NOI process is intended to provide specific controls on work impacting Department Equipment, a number of factors both within and beyond the control of the Concessionaire may impact the Work. Specific elements of the proposed Work plan, such as schedule or means and methods of completing the Work, may require revisions that are not consistent with these provisions in order to safely and effectively complete the Work. As such, these provisions should be treated as a typical application and general framework for control of the Work. When deviations are required due to changing field conditions, no

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reasonable request for changes by the Concessionaire or the Department may be denied without good cause.

- E. Plans related to existing Department Equipment have been prepared using a combination of original design drawings, as-built drawings, supplemental information provided by the Department, and site visits. This NOI process recognizes that complete documentation of the existing Department system is unavailable, the ability to field verify conditions as part of design is limited, and that conditions can change between the time of design and the time of construction. As part of the design development process, it has been agreed that certain information and decisions will be made during construction at such time that the elements of the system can be verified as to precise location and operational status. The Department and the Concessionaire shall work together to identify and coordinate those items that could not be addressed during design.
- F. The Department and the Concessionaire shall regularly work together to coordinate work that may impact Department Equipment. This coordination shall include, but not be limited to, Department staff and representatives attending regularly scheduled construction coordination meetings held by the Concessionaire.
- G. "Impact" is defined as any Work that will interrupt the normal operation of the Department's Equipment.
- H. No Work that impacts Department Equipment identified in the plans shall commence without prior notification to the Department per the provisions of this NOI process.
- I. The Concessionaire shall take all measures to protect Department Equipment during the course of the Work and maintain operation of the equipment. The means and methods for protecting Department Equipment shall be determined on a case-by-case basis appropriate to the scope of the Work.
- J. The Department shall make staff available upon request to assist the Concessionaire in identifying existing system conflicts and operations; conducting Equipment inspections; carrying out maintenance transfers; and testing and acceptance of completed Work. The availability of Department staff shall be coordinated per the requirements of this NOI process. When unexpected conditions arise that requires the input of the Department, the Department shall make staff or authorized representatives available within forty-eight (48) hours of Department receipt of the Concessionaire's written request.
- K. The provisions of this NOI process shall apply to all Work impacting Department Equipment shown on the plans as well as to any Equipment impacted during the course of construction but not identified on the plans. When Equipment not identified on the plans are impacted, the Concessionaire

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shall follow the typical construction processes (such as RFI, FDC, and NDC) to identify and resolve the impact.

- L. The Department shall notify the Concessionaire of any impacts to operations that may be attributable to work at other sites that were not anticipated in the original notification. The Concessionaire and the Department shall coordinate as necessary for unanticipated impacts to operations.
- M. Unless specifically described on the plans or special provisions or directed by the Department in writing, means and methods for completing the Work related to impacted Equipment shall be at the discretion of the Concessionaire. Means and methods shall be consistent with the requirements of the Agreement and the Standards and Specifications.
- N. With the exception of the notification form, written correspondence may include e-mail to those parties listed as contacts in this NOI process or the notification form. Written correspondence shall reference the relevant notification ID number and phase of the process.
- O. Responsibility for maintenance of impacted Equipment shall transfer to the Concessionaire per the approved schedule for start of the Work unless otherwise noted on the notification form. Responsibility for maintenance will transfer back to the Department upon Final Completion of the Work as detailed in the notification process. During the period when maintenance of Department Equipment has been transferred to the Concessionaire, events outside the control of the Concessionaire that impact the condition of the Equipment shall be addressed by the Department including warranty claims and at-fault third parties. The Department shall be notified immediately of any damage to existing Equipment.
- P. The Concessionaire shall be required to submit an amended NOI if work described in initial notification is performed at least forty-eight (48) hours after date stated in the NOI form.
- Q. The Concessionaire shall document all changes to Department infrastructure as a result of work in the NOI in the Opitz Project As-Built Plans according to these Technical Requirements. The as-built plan will be required for all impacted Department Equipment even if such Equipment is not shown on Opitz Project design plans.
- R. Notification Procedure
 - 1. First Notification: 21 Days Prior to Work Start

The Concessionaire shall submit a complete Notification of Impact to Department TMS Asset form to the Department. The form shall be provided a minimum of twenty-one (21) calendar days prior to the proposed start of the Work impacting the Equipment.

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2. Notification Review: 18 Days Prior to Work Start

The Department shall review the form for conformance with the plans and the Agreement. Within 3 days of receipt, the Department shall respond to the submitted form. The Department shall provide one of three responses:

Approved – The form is found to be in conformance with all documented requirements and is approved as submitted. The process moves to the Inspection phase.

Revise and Resubmit – The form is conditionally approved with minor corrections or clarifications required as noted in the Department’s response. The process moves to the Inspection phase and the Concessionaire revises the form as needed for resubmittal prior to the second notification. Besides information gathering, no work shall commence unless otherwise indicated.

Rejected – The form has significant elements that are not in conformance with the plans or the Agreement. The Department notes the specific elements of the form not in conformance and cites the controlling Agreement requirements not met. The Concessionaire shall submit the form again beginning at the first notification.

3. Inspection: 14 Days Prior to Work Start

Following approval or conditional approval of the notification form, the Department and the Concessionaire shall conduct a joint field meeting at the Equipment to be impacted. The Department shall provide the Concessionaire access to the equipment and Equipment to be impacted for general inspection and demonstrate the operational status of the equipment. If the proposed impact is not limited to a single site (e.g., impact to power or communications connecting multiple devices), the Department shall also demonstrate operation at a remote location to establish the existing condition of all elements to be impacted by the Work. The Concessionaire shall document the condition of the site through field notes and photos as needed. The Concessionaire shall provide written notification to the Department of any site deficiencies within twenty-four (24) hours of the inspection. The Department shall assess deficiencies and provide a response to the Concessionaire within forty-eight (48) hours of receipt of the Concessionaire’s report. The response shall include one of the following:

Department Repair/Replace – The Department shall repair or replace deficient equipment prior to the start of the Work. A second inspection shall be scheduled to document the existing condition of the Equipment prior to the start of the Work.

Proceed per Plan – The Department shall instruct the Concessionaire to carry out the Work as shown in the plans and proposed on the notification

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form accepting the condition of the Equipment as is. The Concessionaire shall complete the Work as required by the Agreement and return the system to its existing condition at the time of the inspection, accounting for the deficiencies of the system noted in their report. For example, the Department may instruct the Concessionaire to relocate a camera as called for in the plans even if the camera is inoperative at the time of inspection. The Concessionaire will relocate the camera noting that it was inoperative prior to start and maintaining its current condition.

Request for Change – The Department shall request a change to the plans to address the deficient conditions. This may include requesting the Concessionaire to carry out repair or replacement or removal and disposal/salvage of the impacted Equipment. This process shall follow the typical process for changes to the Agreement, accounting for any impacts to schedule and scope.

4. Second Notification: 10 Days Prior to Work Start

The Concessionaire shall provide a second notification to the Department for the start of the Work. If the notification form was required to be revised and resubmitted as part of a conditional approval, the Concessionaire shall provide the revised form with this notification. The Concessionaire may propose changes to the original request as part of the second notification. This may include minor changes to the schedule of the Work or revisions to the construction work plan. If no updates to the first notification are required, the Concessionaire shall provide only a written reaffirmation of the original notification.

The Department shall approve or reject the updated form within forty-eight (48) hours of its receipt and provide a written response per the requirements of the first notification.

5. Confirming Notification: 24 Hours Prior to Work Start

The Concessionaire shall provide written confirmation of the planned Work a minimum of twenty-four (24) hours prior to the scheduled start of the Work. Minor deviations of the written notification form shall be allowed (such as minor changes in the specific start time and updated contact information)

6. Final Notification: 15 Minutes Prior to Work Start

The Concessionaire shall provide final notification fifteen (15) minutes prior to the start of the Work, if required by the Department as noted on the approved notification form. This notification shall be made for Equipment identified by the Department as being of significant operational value. An Asset of “significant operational value” is one which must remain in operation until an unscheduled Incident or condition is

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resolved. The Department shall identify these Equipment on the notification form. The Concessionaire shall provide this final notification to Department staff as identified by the Department in the notification process.

7. Work: Start of Work

The Concessionaire shall carry out the Work in accordance with the Agreement and approved notification form. The Concessionaire should provide daily updates to the Department on the progress of the Work or as required on the notification form. The Concessionaire shall notify the Department of any events or issues that arise during the course of the Work that may impact the scheduled completion of the Work. The Concessionaire shall provide a plan for recovery of schedule as needed.

8. Notification of Completion: Completion of Work

The Concessionaire shall notify the Department immediately upon completing the Work. The Department shall verify the operation of the Asset as needed to ensure the basic scope of the Work is completed. The Department shall notify the Concessionaire immediately of any impact to normal operation of the Asset following completion of the Work.

9. Return of Maintenance: 48 Hours After Completion of Work

The Concessionaire and the Department shall conduct a return of maintenance inspection within forty-eight (48) hours of completion of the Work. The Department shall inspect the Work on site and provide a written punch list or acceptance as appropriate. Maintenance of the Equipment shall transfer back to the Department upon completion of any punch list items and issuance of the written acceptance. Written acceptance shall be provided no less than forty-eight (48) hours following the final inspection

3.17 Maintenance During Construction

- A. The Concessionaire shall prosecute the Work so as to avoid obstructions to traffic to the greatest extent practicable. The Concessionaire shall provide for the safety and convenience of the general public and residents along the roadway and the protection of persons and property.
- B. The Concessionaire shall maintain the Work from the beginning of construction operations until Final Completion.
- C. The Concessionaire shall keep the portions of the road being used by the public free from irregularities and obstructions that could present a hazard or annoyance to traffic.

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- D. Existing Department Transportation Management System (TMS) devices in the general purpose lanes shall remain operational during construction unless otherwise approved by the Department. These TMS devices include, but are not limited to: (i) closed-circuit television (CCTV) cameras; (ii) dynamic message signs (DMS); (iii) ramp metering; (iv) detection; (v) mile markers; (vi) the reversible gate system; (vii) roadway lighting; and (viii) weather stations.
- E. Existing detection (traffic sensors) shall remain in place during construction activities unless written approval is provided by the Department. Replacement detection shall be installed, operational, integrated, and collecting data before taking existing detection out of service.
- F. The existing continuous count stations shall remain in place and fully operational.
- G. The Department will maintain all roadways and structures used by public, pedestrian and vehicular traffic at its expense, until such time as the paved surface and roadside appurtenances in the active construction work area are significantly impacted by the Concessionaire's construction activities. (Significant impacts include pavement marking eradication, traffic lane shifts, surface paving, placement of temporary traffic barrier service, or similar activities). The highway trucks hauling material on the paved surface are not considered significant impacts. Once the Concessionaire significantly impacts the active construction work area, the Concessionaire shall be responsible for that active construction work area until its Final Completion. The Concessionaire shall be responsible for all maintenance in significant impacted active construction work areas including repairs to the roadway surfaces (fixing holes in the hard surface, patching the potholes and providing smooth surface).
- H. The Concessionaire shall be responsible for the maintenance of the significant impacted assets in accordance with standard Department maintenance requirements. Significant impacted assets for which the owning authority is other than the Department shall be maintained by the Concessionaire until such time as they are no longer impacted by construction and accepted back by the owning authority.
- I. Where traffic will operate on surfaces other than final surface or final alignment, the Concessionaire shall be responsible for maintenance of these roadways, including repair of any damage caused by its operations or use by public traffic.
- J. The existing drainage system will be maintained by the Department until the Concessionaire or any of the Concessionaire's contractors start impacting the drainage system, at which time all drainage assets within the impacted drainage system will become the Concessionaire's responsibility.

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- K. At no time shall the lights in GP Lanes and other roadways be put out of service, unless mutually agreed between the Parties for the purposes of cutover, testing or integration into the ETTM System or NRO PSTOC ATMS.
- L. The existing signal, lighting, and ITS systems will be maintained by the Department until the Concessionaire or any of the Concessionaire's subcontractors begin impacting these assets, at which time impacted signal, lighting and impacted ITS assets within the Opitz Project limits will become the Concessionaire's responsibility. If there is an existing asset the Concessionaire desires to tie in or connect to, but is prevented from doing so because of physical damage to such existing asset the Concessionaire may perform the repair work at its sole cost and expense. Once the Concessionaire has completed the work, and the work is accepted by the Department, the maintenance activities will revert to the Department's responsibility.
- M. The Department will perform snow and ice removal on all travel ways.
- N. The Concessionaire's maintenance of the active construction work area shall be to the level of quality condition existing in the relevant active construction work area at the time Concessionaire takes control of the active construction work area.

3.18 As-Built Documents

- A. As a condition to Final Completion, the Concessionaire shall provide to the Department, the as-built record drawings and documents (As-Built Plans) of the Opitz Project in accordance with these Technical Requirements, the standards and specifications set forth in the VDOT CADD Manual, the VDOT Road Design Manual, and the VDOT Post Construction Manual.
- B. The As-Built Plans shall be prepared by a Professional Engineer licensed in the Commonwealth. A certification statement (with signature and date) shall be provided by the Professional Engineer on all applicable sheets indicating that to the best of his/her knowledge, the As-Built Plans show all adjustments and revisions to the approved construction plans made during construction and serve as a permanent record of the actual location of all constructed elements. The As-Built Plans will show all adjustments and revisions to the Construction Plans made during construction (including NDC's, FDC's and NCR's) and serve as a permanent record of the actual location of all constructed elements. The As-Built Plans shall be in the same format as the construction plans. The As-Built Plans shall be certified by the Concessionaire to reflect the actual condition of the Opitz Project at the end of the Work period and organized and indexed to facilitate easy retrieval of information. Where appropriate, overlapping work packages shall be combined in the As-Built Plans.
- C. Tolling and Traffic Management System

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1. The As-Built Plans shall have Global Positioning System (GPS) location data of all installed ETTM System field devices, including but not limited to; junction boxes (electrical and communication), splice cabinets, CCTV and AID cameras, Dynamic Message Sign (DMS), Microwave Vehicle Detectors, gates, Lane Use Management System (LUMS), pole and ground mounted cabinets, roadway lighting and electrical service panel. A detailed list or spreadsheet of all installed or modified TTMS field devices, including at least the device location, model number, serial number, and test acceptance date shall be part of the As-Built Plans.
2. The As-Built Plans shall provide fiber optic splicing diagrams at every splice point (cabinet or underground) detailing all cable splices, terminations, equipment port assignments, and optical circuits within the communication network. Document the sequential cable length markings at each splice box and pull box wall that the cable passes through, and include the information with the As-Built Plans.
3. The As-Built Plans shall provide splicing details for all existing Department cabinets that have had splicing altered. Splicing details shall include specific fiber numbers.
4. The As-Built Plans shall provide complete details of all bores (successful and failed) on completing the work. Ensure that the plans are dimensionally correct copies of the Construction Documentation and include roadway plan and profile, cross-section, boring location and subsurface conditions as directed by the Engineer. The plans must show appropriate elevations referenced to a permanent Department feature (such as mast arm foundation, manhole inlet cover, or head wall). Plans must be same scale in black ink on white paper, of the same size and weight as the Construction Documentation. Specific As-Built Plans content requirements include but may not be limited to the following:
 - i. The construction plan view shows the center line location of each facility installed, or installed and placed out of service, to an accuracy of 1 inch at the ends and other points physically observed in accordance with the bore path report.
 - ii. As directed by the Department, provide either a profile plan for each bore path, or a cross-section of the roadway at a station specified by the Engineer, or a roadway centerline profile. Show the ground or pavement surface and crown elevation of each facility installed, or installed and placed out of service, to an accuracy of within 1 inch at the ends and other exposed locations. On profile plans for bore paths crossing the roadway, show stationing of the crossing on the Construction Documentation. On the profile plans for the bore paths

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paralleling the roadway, show the Construction Documentation stationing. If the profile plan for the bore path is not made on a copy of one of the construction profile or cross-section sheets, use a 10 to 1 vertical exaggeration.

- iii. If, during boring, an obstruction is encountered which prevents completion of the installation in accordance with the design location and specification, and the product is left in place and taken out of service, show the failed bore path along with the final bore path on the plans. Note the failed bore path as “Failed Bore Path - Taken Out of Service”. Also show the name of the Utility Owner, location and length of the drill head and any drill stems not removed from the bore path.
 - iv. Show the top elevation, diameter and material type of all utilities encountered and physically observed during the subsoil investigation. For all other obstructions encountered during a subsoil investigation or the installation, show the type of material, horizontal and vertical location, top and lowest elevation observed, and note if the obstruction continues below the lowest point observed.
 - v. Include bore notes on each plan stating the final bore path diameter, product diameter, drilling fluid composition, composition of any other materials used to fill the annular void between the bore path and the product, or facility placed out of service. Note if the product is a casing as well as the size and type of carrier pipes placed within the casing as part of the Agreement.
5. The As-built Plans shall show field surveyed locations of all junction boxes and roadside equipment and a coordinate table showing both the Project coordinates and latitudes/longitudes for each. These plans shall also show the field verified cabinet numbers, service panel numbers and roadway lighting pole electrical identification numbers.

D. Drainage

1. Upon completion of the installation of any major drainage structure, the Concessionaire shall prepare a final As-built survey of the major drainage structure and related upstream and downstream appurtenances and provide such survey to the Department. The As-built survey shall include the horizontal location and vertical elevations of the constructed major drainage structure in sufficient detail to confirm pre-construction hydraulic performance. A post construction As-built Hydrologic and Hydraulic Analysis (H&HA) and report shall be developed based on the As-built survey and submitted to the Department for review and acceptance. The post

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construction H&HA shall demonstrate that the anticipated post construction hydraulic performance of the major drainage structure matches or betters that of the pre-construction H&HA. If the post construction analysis shows an impact greater than the pre-construction H&HA or exceeds the construction tolerances established with the pre-construction H&HA, then the Concessionaire shall be responsible for mitigating the adverse impacts of the post construction condition at no additional cost to the Department.

2. The Concessionaire is to insure proper ingress and egress to any storm water management facility and that any specific proprietary facilities have proper maintenance details included in the As-Built Plans.
3. The As-Built Plans shall include the following information:
 - i. Discharge structures – structure identification number, type, locations, dimensions and elevations of all weirs, bleeders, orifices, gates, pumps, pipes, and oil and grease skimmers;
 - ii. Side bank and underdrain filters, or exfiltration trenches – locations, dimensions, and elevations, including clean-outs, pipes, connections to control structures and points of discharge to receiving waters;
 - iii. Storage areas for treatment and attenuation – storage area identification number, dimensions, elevations, contours or cross-sections of all, sufficient to determine stage-storage relationships of the storage area and the permanent pool depth and volume below the control elevation for normally wet systems;
 - iv. System grading – dimensions, elevations, contours, final grades or cross-sections to determine contributing drainage areas, flow directions and conveyance of runoff to the system discharge point(s);
 - v. Conveyance – dimensions, elevations, contours, final grades or crosssections of systems utilized to divert off-site runoff around or through the new system;
 - vi. Water levels – existing water elevation(s) and the date determined;
 - vii. Benchmark(s) – location and description (minimum of one per major water control structure); and

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- viii. Wetland mitigation or restoration areas (if any) – Show the plan view of all areas, depicting a spatial distribution of plantings conducted by zone (if plantings are required by permit), with a list showing all species planted in each zone, numbers of each species, sizes, date(s) planted and identification of source of material; also provide the dimensions, elevations, contours and representative cross-sections depicting the construction.
 4. If Concessionaire prefers to abandon in place any existing drainage structures or Culverts, approval must first be obtained from the Department. All abandoned drainage structures and Culverts shall be depicted on the As-built Plans.
 5. The Concessionaire shall provide As-Built Plans of all storm water management facilities. The As-Built Plans shall show the actual finished ground contours, outlet structure dimensions and elevations and other requirements as they exist at the completion of the Opitz Project. These drawings shall be signed and sealed by a Licensed Professional Engineer or Land Surveyor licensed in the Commonwealth.
 6. The Concessionaire shall provide certification from an independent source that the proposed BMP facilities were constructed in accordance with applicable and current industry standards, and the manufacturer's specifications.
- E. Utilities
1. The Concessionaire shall accurately show the final location of all utilities on the As-Built Plans for the Opitz Project. The Concessionaire will ensure the Utility companies submit As-built drawings upon completion of their relocation or adjustments. The Department shall issue an As-built permit to the Utility companies after receipt of permit application and As-built drawings.
- F. Signing Roll Plans
1. The signing roll plans referenced in Section 3.9.3 of these Technical Requirements shall be updated to reflect final sign locations and submitted as part of the As-Built Plans for the Opitz Project.

3.19 Surveys

- A. The Concessionaire shall preserve all survey control monuments established by the Department and will notify the Department as soon as it is known that a monument is in a position that will interfere with new construction or with Concessionaire activities. If a monument is disturbed, or cannot be preserved

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in place, the Concessionaire shall set the new monument in accordance with the standards referenced set forth in Attachment 1.5a.

- B. All surveying work during the Construction Period shall be performed by the Concessionaire in accordance with the Department's Survey Manual.
- C. The Concessionaire shall be fully responsible for examination and verification of any data made available by the Department.
- D. Immediately after or within 7 calendar days from receiving the Department's request notice, provided the information exists, the Concessionaire shall make available to the Department electronic files of all survey data, for existing and new conditions and infrastructure, which at a minimum include:
 - 1. Survey control data
 - 2. **Digital Terrain Model (DTM) and Construction Cross-Sections:** Compatible to the Department's current DTM format.
 - 3. **Borrow Pits:** All borrow pit DTM's or cross-sections, originals and finals.
 - 4. **Horizontal and Vertical Control for Bridges:** Certified plats, field notes, coordinates, and computations shall be furnished by the Concessionaire prior to the Concessionaire beginning work on these structures.
 - 5. **Pipes, Culverts, Ditches and Related Appurtenances:** Existing, newly installed control and as-built survey data for existing and new pipes, culverts and ditches which at a minimum include horizontal and vertical controls, type, size, materials and inlet/outlet control, catch basins and manhole and other related infrastructure.
 - 6. **Road Right of Way:** Existing, newly constructed/installed control and As-built survey data for right-of-way cross section showing roads, lane configuration, shoulders, access and egress ramps and connections, embankments, utilities, drainage and all infrastructure within the road right of way, and for areas where connecting roads and infrastructure are impacted by the work. The survey interval shall not be farther than 100-foot intervals. The data prepared by the Concessionaire shall include coordinates, type, size, material and references.
- E. The Opitz Project Right of Way shall be staked by the Concessionaire in areas where work shall occur between the GP Lanes and the limits of the Opitz Project Right of Way if no limited access fence is present prior to the start of the work. Right of Way stakes shall be placed at a minimum of 100-foot intervals on each side of the roadway or as directed by the Department and the

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stakes shall be marked with both the station and offset back to centerline. All final boundary stakeouts shall be performed by the Concessionaire.

- F. Final right of way monumentation shall be performed by the Concessionaire in accordance with the following:
 - 1. RM-1: The Concessionaire shall furnish and install RM-1 right-of-way monuments in accordance with the Road and Bridge Standards.
 - 2. RM-2: The Concessionaire shall furnish and install RM-2 right-of-way monuments and optional locator posts, including the required caps, in accordance with the Road and Bridge Standards.
- G. The Department shall determine if an alternative form of permanent monumentation shall be used if RM-1 or RM-2 monuments are unsuitable for marking the right-of-way at various locations.
- H. The Concessionaire shall indicate this alternative monument usage on the final As-built Plans in accordance with the Department's Survey Manual. Electronic data files along with paper sketches and drawings shall be furnished by the Concessionaire. All electronic data files furnished by the Concessionaire shall be in the format of the Department's current computer hardware and software.
- I. Additional surveying work and supplemental layout work shall be performed by the Concessionaire as needed to successfully complete the Work. The Concessionaire shall provide and protect all construction benchmarks within the construction limits. Construction benchmarks shall be located not farther than 500 feet apart for the total length of the Opitz Project. Construction benchmarks that are disturbed during construction operations shall be reestablished by the Concessionaire. All drawings, field notes, and computations from such survey work performed by the Concessionaire shall be submitted to the Department.
- J. The Concessionaire shall field-verify all dimensions of the existing noise barriers within the Opitz Project corridor for the modeling of the existing noise barriers assumptions necessary for the final noise study.

3.20 Security

3.20.1 General Requirements

- A. Subject to the requirements of the Agreement, the Concessionaire shall adhere to the intent of the Department policy on critical infrastructure information and sensitive security information (CII/SSI) to the extent such information is directly related to the Concessionaire's performance of its obligations under the Agreement. The Concessionaire shall ensure that relevant CII/SSI is protected and not disclosed to unauthorized persons. The Concessionaire shall ensure that all personnel having access to CII/SSI for the Concessionaire and

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all subcontractors have met the requirements of IIM-LD-236 Critical Infrastructure (CII) / Sensitive Security Information (SSI).

- B. The Concessionaire shall comply with requirements of the Security Management Systems (SMS) and protocols for the Express Operations Center as described in Attachment 1.10 of these Technical Requirements.
- C. The Department may request fingerprint-based criminal history background checks on contractors working on specific structures or functions.
- D. The Concessionaire shall review with the Department any information that should be designated as CII/SSI as specific design details become available. Any requirements for security review or other inspections will be mutually agreed to with the Department.

3.20.2 Concessionaire's Responsibility During Suspension of Construction

- A. In case of suspension of construction Work, the Concessionaire shall take such precautions as may be necessary to prevent damage to the Work, provide for erosion control and drainage, and erect any temporary structures, signs, or other facilities necessary or appropriate for the protection of the Work and the public. During the suspension of the Work, the Concessionaire shall properly and continuously maintain in acceptable growing condition all living material in newly established plantings, seeding, and soddings furnished under the Agreement and shall take adequate precautions to protect vegetation against damage.

3.21 Not Used